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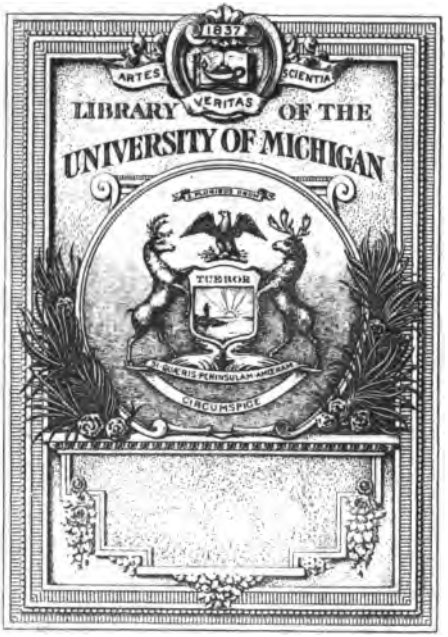
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ANNUAL REPORT

COMMISSION ON WATERWAYS AND PUBLIC LANDS

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COMMISSION ON WATERWAYS AND PUBLIC LANDS

JOHN N. COLE, Chairman
JESSE B. BAXTER
WILLIAM S. McNARY

STATE HOUSE, BOSTON

Public Document No. 118

FIRST ANNUAL REPORT

OF THE

COMMISSION ON WATERWAYS AND PUBLIC LANDS.

CONSOLIDATING HARBOR AND LAND COMMISSION AND DIRECTORS OF THE PORT OF BOSTON.

FOR THE YEAR 1916.

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The Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Commission on Waterways and Public Lands, pursuant to the provisions of law, respectfully submits its first annual report, covering the period from Aug. 3, 1916, to Nov. 30, 1916, and including the doings of the Directors of the Port of Boston and of the Board of Harbor and Land Commissioners from Dec. 1, 1915, to Aug. 3, 1916, to whose powers and duties the Commission succeeded under the provisions of chapter 288 of the General Acts of 1916.

In presenting this report it would seem not out of place to briefly review the organization of the different departments of public service which have been consolidated under the present Commission.

The Board of Harbor and Land Commissioners, created under chapter 263 of the Acts of 1879, provided in itself a consolidation of the departments of service which had, under the titles of Board of Harbor Commissioners, Board of Land Commissioners, and other agencies, exercised the powers and duties with which they were charged with respect to the lands, rights in lands, flats, shores and rights in tidewaters belonging to the Commonwealth up to that time.

The personnel of the original Board of Harbor Commissioners, established by chapter 149 of the Acts of 1866, was such as to create a viewpoint from which not only that Board worked out wisely and efficiently the important functions entrusted to it, but likewise a viewpoint from which the later Boards and Commissions have worked out problems that have come in the succeeding years.

The various members of the Board of Harbor and Land Commissioners during the period 1879–1916, inclusive, were: —

Albert Mason (chairman),	1879–1882
Willard P. Phillips,	1879–1881
Francis A. Nye,	1879–1883
Henry L. Whiting,	1881–1884
John E. Sanford (chairman),	1882–1891
John I. Baker,	1883–1897
Joseph K. Baker,	1884–1886
Charles H. Howland,	1886–1898
Henry W. Swift (chairman),	1892–1894
Woodward Emery (chairman),	1894–1906
Clinton White,	1897–1901
Charles C. Doten,	1898–1905
George E. Smith (chairman 1906–1911),	1901–1913
John J. Flaherty,	1905–
Henry J. Skeffington,	1905–1908
Samuel M. Mansfield,	1906–1912
Heman A. Harding,	1908–1911
Charles C. Paine,	1911–1916
William S. McNary (chairman),	1912–1916
George M. Harlow,	1914–1916

Beginning with the discharge of its duties, which in 1879 were largely confined to dredging operations in Boston Harbor; the reclamation, improvement and development of the territory commonly known as the South Boston Flats; the sale, following reclamation, of the Back Bay lands in Boston; and other important transactions, the scope of this Board's work, by legislative enactments and otherwise has been considerably increased, and its jurisdiction, originally limited almost exclusively to projects previously defined above, extended, up to the establishment of the Commission on Waterways and Public Lands, to the Connecticut River; to the non-tidal part of the Merrimac River; to great ponds belonging to the Commonwealth; to the allotment of funds placed at its disposal by the Legislature for river and harbor improvements, and to other matters.

Chapter 748 of the Acts of 1911 sets forth in detail the organization and laws controlling the creation of the Board

serving from that time until 1914 as the Directors of the Port of Boston.

SECTION 1. The governor, with the advice and consent of the council, shall appoint three persons, and the mayor of the city of Boston shall appoint one person, and the four persons so appointed, with the chairman of the harbor and land commissioners, ex-officio, shall constitute a board to be known as the Directors of the Port of Boston, hereinafter called the directors. The terms of office of the persons first appointed by the governor shall be so arranged and designated at the time of their appointment that the term of one member shall expire in three years, one in two years and one in one year from the first day of July, nineteen hundred and eleven, and the term of office of the member appointed by the mayor shall expire in three years from the first day of July, nineteen hundred and eleven. Annually thereafter the governor shall appoint one member to serve for three years, as the term of any member appointed by him shall expire; and at the expiration of the term of the member appointed by the mayor, the mayor shall appoint a member to serve for three years. Any vacancy occurring among the directors shall be filled for the unexpired term by the governor or by the mayor, accordingly as the vacancy occurs among the members originally appointed by the governor or by the mayor, respectively. In all cases a member shall continue to serve until his successor is appointed and qualified. The governor shall designate the chairman, who shall receive an annual salary of fifteen thousand dollars, and shall devote his whole time to the work of the directors. The other directors, including the chairman of the harbor and land commissioners, shall each receive an annual salary of one thousand dollars. Said sum of one thousand dollars shall be in addition to the annual salary of the chairman of the board of harbor and land commissioners as chairman of said last named board.

SECTION 2. The Directors of the Port of Boston shall be the administrative officers of the port, shall cause to be made all necessary plans for the comprehensive development of the harbor, shall have immediate charge of the lands now or hereafter owned by the commonwealth upon or adjacent to the harbor front, except lands under the control of the metropolitan park commission or of the metropolitan water and sewerage board, and of the construction of piers and other public works therein, shall administer all terminal facilities which are under their control, shall keep themselves thoroughly informed as to the present and probable future requirements of steamships and shipping, and as to the best means which can be provided at the port of Boston for the accommodation of steamships, railroads, warehouses and industrial establishments. The directors shall appoint such engineers, clerks, agents, assistants and other employees as they may deem necessary to carry out the purposes of this act, and shall determine the duties and compensation

of such employees. The appointment of employees shall be subject to the laws relating to civil service in the commonwealth, so far as they are applicable.

SECTION 3. The directors shall have an office in the city of Boston in which they shall keep maps, charts, plans and documents relating to the lands and waters in their charge. The board of harbor and land commissioners shall deliver to the directors such maps, charts, plans and documents now in the custody of said board relating to the waters and lands in charge of the directors as may be practicable; and the directors shall at all times have access to any other maps, charts, plans and documents relating to said waters and lands, in the office of said board or in the office or custody of any other public board, commission or official.

SECTION 4. All the rights, powers and duties now pertaining to the board of harbor and land commissioners in respect to such lands, rights in lands, flats, shores, waters and rights belonging to the commonwealth in tidewaters and land under water as constitute that part of Boston harbor lying westerly and inside of a line drawn between Point Allerton on the south and the southerly end of Point Shirley on the north, or as adjoin the same or are connected therewith, and any other rights and powers heretofore vested by the laws of the commonwealth in the board of harbor and land commissioners in respect to any part of said area, are hereby transferred to and hereafter shall be vested in and exercised by said directors. There shall also be transferred to and vested in the directors the right to expend any unexpended funds heretofore appropriated to be expended by the board of harbor and land commissioners in the area above designated, and the right which the board of harbor and land commissioners has heretofore exercised in regard to moneys paid to the commonwealth in accordance with the provisions of section twenty-three of chapter ninety-six of the Revised Laws. Said directors shall also assume and take over, on behalf of the commonwealth, any rights, powers and duties of the board of harbor and land commissioners under any contracts heretofore made for the improvement, filling, sale, use or other disposition of the lands, flats or waters of the commonwealth within said area, including any structures now existing or being built therein or thereon.

SECTION 5. With the consent of the governor and council, the directors may take or acquire by purchase or otherwise, and hold, such real property and such rights and easements therein as the directors may from time to time consider necessary for the purpose of constructing, or securing the constructing or utilizing of, piers and, in connection therewith, highways, waterways, railroad connections, storage yards and sites for warehouses and industrial establishments, and may lay out and build thereon and upon such other lands as under section four of this act are under its jurisdiction such piers, with buildings and appurtenances, docks, highways, waterways, railroad connections, storage yards and public warehouses as, in the opinion of the directors, may be desirable: *provided*,

however, that if general plans bearing the signed approval of the directors or of a majority of them, or, until the appointment and organization of the directors bearing the signed approval of the board of harbor and land commissioners, given after due notice and a hearing, describing the property and showing the location and character of any proposed docks, piers, wharves, warehouses, factories, power plants, and industrial terminals, of adequate and proper design and general suitability for the purposes for which they are to be used, shall be filed with the directors, together with a written notice signed by the owners or lessees or by others having legal right in the premises, stating that they propose to construct upon the property described the improvements shown by said plans and claiming exemption from the taking by eminent domain as authorized by this act of any of such property, including the lands upon which said improvements are to be constructed, then said land and said improvements shall not be taken by the directors by the right of eminent domain without the authorization of the general court granted within forty years after the date of the filing of said plans, if substantial construction in general accordance with such plans is actually begun in good faith within one year after the date of the approval by the directors of the plans, and if said improvements are finished substantially in accordance with said plans within five years after the beginning of the construction of said improvements unless the directors shall extend the time within which said improvements shall be completed; and *provided, further*, that after completion, said improvements during said period of forty years are kept in suitable repair and are used for the purposes to which said approval applied, and *provided, further*, that if general plans bearing the signed approval of the directors or of a majority of them, given after due notice and a hearing, and describing the property, and location and character of any existing docks, piers, wharves, warehouses, factories, power plants, and industrial terminals, and certifying that they are of proper design and adequate and suitable for the purposes for which they are to be used, and that they are in proper condition and in thorough repair, shall be filed with the directors, together with a written notice signed by the owners or lessees, or by others having legal rights in the premises and claiming exemption from the taking by eminent domain as authorized by this act of any such property, including the lands upon which said improvements have been constructed, then said land and said improvements shall not be taken by the directors by the right of eminent domain without the authorization of the general court granted within forty years after the date of the approval by the directors, if during that time such property is kept in suitable repair and is used for the purposes to which said approval applied, and *provided, further*, that none of the exemptions from the right of eminent domain provided for in this act shall apply to the taking by the directors of any property necessary for providing suitable and convenient track connections between the rails serving any pier or piers that may be built, or acquired or improved under the terms of this act and the rails of any

existing or proposed railroad that now reaches or hereafter may reach Boston.

SECTION 6. In order to take any property by right of eminent domain, the directors shall within ninety days after voting to take any lands or easements therein file and cause to be recorded in the registry of deeds for the county in which the property to be taken is situated, a description thereof sufficiently accurate for identification, with a statement of the purposes for which the same was taken, signed by a majority of the directors. The recording shall operate as a taking of the real estate and of the rights and easements therein described. No taking shall be valid unless it is recorded in accordance with the provisions of this section.

SECTION 7. The commonwealth, through its treasurer and receiver general, shall pay all damages to property sustained by any person, firm or corporation by the taking of any land or any right or easement therein. Any person, firm or corporation sustaining damage as aforesaid, and failing to agree with the directors as to the amount thereof, may have the same assessed and determined in the manner provided by law in the case of land taken for the laying out of highways, on application at any time within three years after the taking of such land or right or easement therein; but no such application shall be made after the expiration of the said three years.

SECTION 8. All piers and other similar structures built by the directors shall be equipped, either by the directors or by the lessees thereof, with fireproof sheds, railway tracks, cranes and other machinery and accommodations for the convenient, economical and speedy loading and discharge of freight; and the directors may acquire, hold and operate such lighters and other vessels as may be convenient and, in the opinion of the directors, needed for that purpose. The directors shall make such reasonable rules and regulations and shall charge such reasonable rates for the use of such structures and equipment as they may from time to time deem wise.

SECTION 9. The directors shall have power to lease for a period not exceeding twenty years, under such covenants and conditions as they may prescribe, storage facilities, wharves, piers, bulkheads, docks, sheds, warehouses and industrial locations within their charge; but no lease for a term exceeding five years shall be valid until approved by the governor and council. The income from all wharfage and storage rates, use of cranes, lighterage, dockage and other charges, and from the leases of lands, storage structures, wharves, piers, docks, sheds, warehouses and industrial sites shall be collected by the directors and paid into the treasury of the commonwealth.

SECTION 10. The directors, with the approval of the governor and council, are authorized to grade and surface suitably any railroad locations or traffic ways which are or may be located on lands, flats or rights therein, now owned or hereafter acquired by the commonwealth under

the provisions of this act, and to carry said ways or railroads over or under any railroad or railway location or public way in order to eliminate crossings at grade, and to provide suitable and convenient track connections between the rails serving any pier or piers and those of any existing or proposed railroad that now reaches or hereafter may reach Boston. All piers held or controlled by the directors shall also be accessible and open to all teaming and lighterage traffic, subject to such regulations as the directors may from time to time make.

Upon application to the directors, any railroad company that now reaches or hereafter may reach Boston, either by its own rails or under trackage or traffic contract or agreement with any other railroad company, shall be provided by the directors with a track connection with the tracks serving such pier or piers.

SECTION 11. The directors shall take all proper measures to obtain from the city of Boston, without expense to the commonwealth therefor, a conveyance of all the present right, title and interest of the city in and to Apple Island, and the flats appurtenant thereto, and in and to any other flats and rights of the city on the easterly side of East Boston, which, in the opinion of the directors, are required for the development contemplated by this act, and the city of Boston is hereby authorized to make such conveyance, and also in furtherance of the development of the port to make conveyance to the directors or others, but only for maritime or commercial improvement, of any shore lands owned by it elsewhere, acquired either by purchase or taking.

SECTION 12. It shall be the duty of the directors forthwith to make, and, so far as may be practicable, to put into execution, comprehensive plans providing on the lands now owned or hereafter acquired by the commonwealth in the area described in section four of this act, adequate piers, capable of accommodating the largest vessels, and in connection with such piers suitable highways, waterways, railroad connections and storage yards, and sites for warehouses and industrial establishments. The directors shall report to the next general court, on or before the fifteenth day of January, nineteen hundred and twelve, all necessary plans and estimates of cost for the construction of a dry dock equipped with modern facilities and appliances, sufficient in size for the accommodation of any modern ocean steamship.

SECTION 13. The directors shall, on the first day of January of each year, submit a report to the general court, which report shall contain a statement of the doings of the directors during the preceding year and such recommendations as to legislation as, in the opinion of the directors, may be necessary or expedient to enable them better to administer the affairs of the port of Boston and to regulate the shipping therein and the use of the piers, docks and terminal facilities under the charge of the directors.

SECTION 14. There shall be paid out of the treasury of the commonwealth, to be expended by the directors during the year ending on

the thirty-first day of December, nineteen hundred and eleven, the sum of fifty thousand dollars for the salaries and expenses of the directors and for defraying the cost of the studies and plans described in section twelve of this act.

SECTION 15. Every authority or license granted since the year eighteen hundred and sixty-eight by the general court, or by the board of harbor and land commissioners, to any person, firm or corporation to build or extend a wharf or other structure upon, or to drive piles in, or to fill or otherwise to occupy, land in tide or navigable water, within the area described in section four and under the control of said directors, revocable at the discretion of the general court, and every other similar right or privilege within said area, subject to the control of said directors, revocable at the discretion of the general court in the manner provided by law, whether or not compensation has been paid under any provision of law or otherwise, shall hereafter cease and determine, or be subject to forfeiture, in case of the non-use of the same for an unreasonable time without reasonable cause, and it shall be *prima facie* evidence that the same is held unused in restraint of trade when the tendency of such non-use is to prevent competition in its broad and general sense, unless such person, firm or corporation shall within one year after the passage of this act make reasonable and substantial use of structures, or shall reasonably and substantially occupy land in tide or navigable waters, for the purposes for which the authority or license was granted; and thereupon, every such authority or license and every similar right and privilege shall cease and determine on re-payment, or tender of re-payment, by the commonwealth of compensation therefor to the amount which shall have been paid into the treasury of the commonwealth in accordance with the terms of such authority or license; and it shall be the duty of the harbor and land commissioners and of the attorney-general, or of their successors in office, to cause a proper certificate of the revocation of such authority or license to be recorded forthwith in the registry of deeds for the county within which such structure was built or work done.

SECTION 16. The supreme judicial court shall have jurisdiction in equity, upon information filed by the attorney-general, of violations of the provisions of this act.

SECTION 17. To meet expenses that may be incurred under the provisions of this act the treasurer and receiver general is hereby authorized, with the approval of the governor and council, to issue bonds, scrip, or certificates of indebtedness to an amount not exceeding nine million dollars, for a term not exceeding forty years, to be in such form, to bear such rate of interest, and to be issued in such amounts, from time to time, as the treasurer and receiver general, with the approval of the governor and council, shall determine.

SECTION 18. Chapter six hundred and forty-eight of the acts of the year nineteen hundred and ten, and all acts and parts of acts inconsistent herewith are hereby repealed.

SECTION 19. The provisions of section one relative to the appointment of directors of the port of Boston, and the provisions of section five relative to the approval of certain plans by the board of harbor and land commissioners until the appointment and organization of said directors, shall take effect upon the passage of this act. The remaining provisions of this act shall take effect thirty days after its passage: *provided, however*, that the board of harbor and land commissioners shall continue to exercise all powers now vested by law in said board to the extent of taking action at any time within three months after the passage of this act upon any petition now pending before said board upon which a public hearing was held, or an order of notice of a public hearing was issued, prior to the passage of this act. [*Approved July 28, 1911.*

This legislation was in response to a conviction held by many of the leading business interests of Boston and vicinity that the time had come for a more intensive development of the port facilities in and about Boston Harbor. The creation of this particular Board having to do with Boston Harbor lessened by that much the duties and responsibilities of the Harbor and Land Commissioners, and resulted in a general plan for more concerted efforts to give Boston a commanding place among the leading ports of the world.

Legislation in 1914 made a further change in the organization of the Directors of the Port of Boston, chapter 712 of the Acts of 1914 providing a change in section 1 authorizing the Governor to appoint three persons to constitute the Board of Directors of the Port of Boston, one member to be designated as chairman, all to devote their entire time to the work, and each member to receive an annual salary of $6,000.

The officials holding office as Directors of the Port of Boston from the creation of the Board until its consolidation were as follows: Hugh Bancroft, chairman, Joseph A. Conry, William F. Fitzgerald, George E. Smith, Francis T. Bowles, William S. McNary, Edward F. McSweeney, chairman, and Lombard Williams.

Under the direction of the original Board of Directors of the Port of Boston, the broad plan for development provided for an expenditure of $9,000,000. On Aug. 1, 1916, this amount had either been expended or apportioned for expenditure as follows: —

	Amount allotted for Work under Contract or necessary to complete Work already contracted for.	Amount expended.
Construction of Pier No. 5 and other work in connection therewith, including two floating grain elevators.	-	$3,591,286 90
Construction of Fish Pier and adjacent streets, . . .	-	96,411 36
Construction and epuipment of dry dock, ...	$2,015,196 01	624,865 29
Construction of railroad tracks to furnish service to 216 acres of Commonwealth flats at South Boston.	12,000 00	485 10
For taking of land and flats at East Boston, including the Eastern Railroad Pier.	265 89	1,354,652 21
Construction work on same, ...	168,009 26	171,723 20
Dredging minor channels in different parts of harbor, .	77,450 00	57,516 56
Studies for the lay-out and construction of additional docks, piers and harbor lines.	3,548 13	52,089 13
Construction of bulkhead on South Boston flats, . .	24,535 87	3,336 13
	$2,301,005 16	$5,952,338 88

From the above it will be seen that practically all of the $9,000,000 had been used or allotted for specific contracts previous to the consolidation of the Boards in 1916, there being available at that time for any plan which might be worked out by the Commission on Waterways and Public Lands a balance of $746,655.96.

Chapter 288 of the General Acts of 1916 provided for the reorganization of the Board of Harbor and Land Commissioners and the Directors of the Port of Boston into a single Board, to be known as the Commission on Waterways and Public Lands.

The legislation was as follows: —

SECTION 1. The board of harbor and land commissioners, established under the provisions of chapter ninety-six of the Revised Laws, and the board known as the directors of the port of Boston, established under the provisions of chapter seven hundred and forty-eight of the acts of the year nineteen hundred and eleven, as amended by chapter seven hundred and twelve of the acts of the year nineteen hundred and fourteen, are hereby abolished. All the rights, powers, duties and obligations conferred and imposed by law on said board are hereby transferred to, and shall hereafter be exercised and performed by, the commission hereinafter established which shall be the lawful successor of said boards. Immediately upon the appointment and qualification of the members of said commission, all books, papers, maps, charts, surveys, plans, records, and all other documents or equipment in the possession of said boards,

shall be delivered to the commission. All existing contracts, and obligations of the directors of the port of Boston and the board of harbor and land commissioners shall be assumed by the commission. All the employees of said boards shall, as temporary appointees, continue to perform their usual duties upon the same terms as heretofore until removed by the commission, but any of the present employees of said boards shall be eligible to appointment without further examination.

SECTION 2. The governor, with the advice and consent of the council, shall appoint three persons to serve for terms of one, two, and three years, respectively, from the first day of July, nineteen hundred and sixteen, as the governor may specify, who shall constitute a board to be known as the Commission on Waterways and Public Lands. As the term of each member expires, the governor shall, in like manner, appoint a successor for a term of three years, and shall fill any vacancy for the unexpired term. Any member may be removed by the governor with the advice and consent of the council. The governor shall designate one member to serve as chairman, who shall receive an annual salary of four thousand five hundred dollars. The other members shall each receive an annual salary of four thousand dollars. They shall be furnished with suitable quarters in the state house.

SECTION 3. The commission shall appoint a superintendent of commerce and a superintendent of engineering who shall each receive such salary as the commission may determine, with the approval of the governor and council. They shall, under the control of the commission, perform such duties as may from time to time be assigned to them respectively by the commission. The commission may also employ such clerical and other assistance as may be necessary for the performance of its duties, subject to all general laws, now or hereafter in force, relating to appointments and employment in the civil service of the commonwealth.

SECTION 4. The commission shall, on the first day of January of each year submit a report to the general court, which report shall contain a statement of the doings of the commission during the preceding year and such recommendations as to legislation as in the opinion of the commission may be expedient to carry on the duties of the commission.

SECTION 5. So much of this act as provides for the appointment of the commission hereby established shall take effect upon its passage. All other provisions thereof shall take effect upon the qualification of the members of said commission, but not earlier than July one, nineteen hundred and sixteen. [*Approved June 1, 1916.*

In accordance with the law, the following were named as members of the Commission: John N. Cole of Andover, designated chairman by the Governor, Jesse B. Baxter of Milton, and William S. McNary of Boston. The Commission took over the work of the department Aug. 3, 1916.

Of necessity, much of the time of the commissioners, not required for consideration and oversight of activities already entered into by the two Boards consolidated, has been given to many of the minor details associated with the work of reorganizing the two extensive departments into one single organization.

It was early apparent that a reorganized department could considerably lessen the number of employees that had been carried by the two departments, and through a well-organized single department materially decrease the cost of maintenance.

The results of the reorganized work, in so far as maintenance is concerned, may be shown in a review of the expenditures of both departments in 1916 and the estimated cost of maintenance for 1917, as submitted to the Auditor's department, set forth in the following figures: —

Cost, 1916: —	
Both departments,	$208,450 05
Average per month,	17,370 83
Both departments, eight months, to August,	153,226 23
Average per month,	19,153 28
Both departments, four months, August to December,	55,223 82
Average per month,	13,805 95
Estimate, 1917: —	
Both departments, on old basis of activities,	137,100 00
Average per month,	11,425 00

Actual saving on basis of maintenance of same departments, $7,728.28 per month, $92,739.36 per year.

The detailed report of the activities of the Commission on Waterways and Public Lands, for the four months in which it has had direction of the department, is contained in the general report which follows of all activities for the year, under headings directly referring to the many different projects, largely undertaken by the two separate Boards previous to the organization of the Commission.

The more important projects in which the Commission has been particularly concerned and for which it has the more direct responsibility are as follows: —

Boston Dry Dock.

Through contracts made by the Directors of the Port of Boston in 1914, approved by the Governor and Council in 1915, and further affirmed by legislative action in 1915, the Commission on Waterways and Public Lands found the Commonwealth pledged to the construction of a dry dock in connection with the development work in South Boston.

The Commission was confronted with a serious situation in connection with the dry dock the day it took office, for a break in the cofferdam which had occurred in July had raised contractual and engineering complications for which it had no direct responsibility and in connection with which it had had no official relation. Through frequent consultations with the Attorney-General's department, and upon careful study of the situation, it became clear to the Commission that no action was possible that could result in any change or abrogation of the existing contract without involving the Commonwealth in serious financial difficulties. The engineering problems seemed to demand a review that should represent a thoroughly unbiased judgment, and this led the Commission to call in consultation two engineers of high standing, to report upon the conditions associated with the contract as it then existed and the condition of the work as it could then be seen.

While the repair of the cofferdam by the contractor, within the rights which the contract gave to him, appears at the present time to be satisfactory, the Commission believes that the study made by the advisory engineers is of great value in its bearing upon consideration that may be given to the future progress of the work as it is checked from time to time.

Contracts made by the Directors of the Port of Boston covered only that portion of the work directly related to the construction of the dock itself, irrespective of electrical equipment, machine shop construction, or several other of the important parts that must be provided before the dock is available for use. To complete the dock it will be necessary for the Legislature to provide further funds. The condition of the market with respect to such machinery and construction as

will be needed, not yet contracted for, seems to make it unwise to prepare an estimate at this time.

The Commission has been seriously concerned over the failure to make any provision for a definite return upon the large amount of money which the Commonwealth has pledged itself to provide for the construction of the dry dock. Arrangements made by the Directors of the Port of Boston with the steamship companies, which already held binding contracts for the use of Commonwealth Pier No. 5, contemplated the use of the dry dock by these steamship companies, through which $50,000 a year at least should come to the Commonwealth. These agreements with the steamship companies have been abrogated by them, and there seems little likelihood that they can be held to their fulfillment.

Construction of similar docks in other parts of the country, almost entirely by private corporations, has always contemplated the co-operation of the Federal government. The most recent arrangement made by the Federal government is in connection with a dock very similar to that which Boston is building, located at Hunters Point on the Pacific coast, to be constructed by the Union Iron Works, providing for a minimum use of the dock by the Federal government that should return to the owners not less than $50,000 a year for six years.

The Commission has entered into arrangements with the Federal government, aided by the Massachusetts members of Congress in the House and Senate, to secure an agreement by which the Federal government shall become a party to the maintenance of the Boston Dry Dock to an extent at least equal to that covered by the contract between the Federal government and the Union Iron Works for the use of the Pacific coast dock.

East Boston Land.

Contracts entered into by the Directors of the Port of Boston provided for establishing a rehandling plant that would reclaim a portion of the flats owned by the Commonwealth in East Boston. It was evident to the Commission early in September that the large amount of material being excavated in the rivers about Boston Harbor and in the harbor itself

could be wisely deposited in the receiving basin already established, and rehandled to the still further advantage of land development in East Boston; otherwise this material would be taken to sea. Favorable terms offered by the contractor led the Commission to make a supplemental contract for the rehandling of an additional amount of filling at an expense approximating $541,450 for the entire project. This money was allotted from the Development of the Port of Boston Loan Fund, and will provide for the filling of an area that will provide practically 150 acres of land in East Boston available for industrial and port development during the coming year.

Hayward's Creek.

Under date of Oct. 19, 1916, the Commission voted unanimously to recommend to the Governor and Council the approval of a project for the development of Hayward's Creek in Quincy. The immediate necessity for consideration of this matter was a communication from the Fore River Shipbuilding Corporation setting forth the manner in which the naval program of the Federal government would affect the activities in the various shipbuilding yards of the country. Officials of the Fore River Shipbuilding Corporation, in conference with the Commission on Waterways and Public Lands, made it clear that unless additional room could be provided in the vicinity of their existing yard at Fore River it would be impossible for them to submit bids for that portion of the work to be allotted by the Federal government which would naturally come to the Fore River Corporation. It was submitted that conditions were such that it was practically impossible for them to acquire the necessary land. An investigation of the project made it evident to the Commission that not only could service be provided to the Fore River Shipbuilding Corporation for the needs which they expected would arise, but the particularly fortunate location of Hayward's Creek in its relation to possible development of transportation service for southeastern Massachusetts demanded favorable consideration on the part of the Commonwealth for a development of this water service. Upon definite guaranty made by the Fore River Shipbuilding Corporation to lease the entire land that might be taken for a term

of years, at a rental which should provide a fair return upon the investment, the Governor and Council approved of the proposition for an ultimate taking of the land that should be needed for the development of Hayward's Creek.

Uncertainty in connection with some features in the original agreement has caused the commissioners to defer temporarily the actual taking of any property involved in the original plan. While this postponement has been made because of the changing conditions associated with immediate service to a great industry that would have employed a number of thousand additional workers within the Commonwealth, the Commission is convinced that there must ultimately be a development of this particular section for the right kind of service in and about Boston Harbor.

Boston Terminals.

A large amount of information and discussion that has been given to this subject in the past ten years has sufficiently emphasized the importance of improved conditions in connection with Boston terminals. It is neither necessary nor wise to review the many reports that have been made relative to this subject or to call attention to the important recommendations following such reports. It is important, however, that the Legislature should not lose sight of the direct relation which properly developed and improved terminals bear to the question of port facilities in Boston and the entire transportation problem of the Commonwealth.

The subject, in general, has received careful consideration from the members of this Commission for many years. The direct responsibility coming to the commissioners in their present positions impresses more strongly than ever the need for action in relieving the terminal situation in Boston. Whether the situation shall be relieved by a developed belt line with proper connections with all the existing railroads, whether a properly organized system of car floats is the answer to the modern requirement for more direct connection between railroad terminals, docks and piers and other shipping points, or whether some modification of both of the above systems with a more satisfactory co-relation of all the different services is the

solution of the problem, requires more extended discussion and consideration than can be given in this connection. The Commission is convinced, however, that conditions noted in connection with Boston development for the past few years make imperative some system of reorganized terminal facilities that shall provide more direct connection between railroad terminals and water terminals, and further, that in the organization of such a system the time has come for certain service in connection with terminals foreshadowed by the development work already accomplished.

Previous reports of commissioners connected with developing the port of Boston have touched upon the availability of certain locations within the control of this Commission for extended fruit and produce markets and for free storage points for cotton, wool, lumber and iron. The present methods of handling a part of these commodities directly relate to the daily life of the entire community served by Boston as the market place of New England, and the relation of others to the very important industrial development of all New England makes the problem of this service one of the most vital that can be considered by this Commission.

The State already owns land better adapted to a developed service of this sort than appears to be available anywhere else. Studies and plans for such a use of this land as shall provide the needed relief to present uneconomic and inefficient methods are now being made under the direction of this Commission.

Boston Harbor Improvements.

The Commission recommends that legislation similar to that contained in chapter 635 of the Acts of 1913 be enacted in order to enable it to continue certain dredging operations necessary to be carried out in Boston Harbor. The act of 1913 aforesaid provided for the expenditure by the Directors of the Port of Boston of the sum of $75,000, to be expended during the years 1913, 1914 and 1915.

The necessity for the expenditure by the Commission for the improvement of some of the tributaries of Boston Harbor makes it imperative for the Commission to be permitted to expend from time to time such amounts as it may deem neces-

sary and advisable from the principal of the Harbor Compensation Fund, and the Commission recommends legislation to carry this recommendation into effect.

Other State Piers.

Under the authority of chapter 693 of the Acts of 1914, the Harbor and Land Commissioners made a contract, on Jan. 5, 1915, for the construction of a State pier at New Bedford. The site for the pier was provided by the city, and the construction of the pier was designed to make a service for that particular community directly related to the handling of the raw material required by the extensive manufacturing interests of that section of the Commonwealth. The contract for this work required that it should be completed Feb. 1, 1916. Upon taking office, the Commission on Waterways and Public Lands found that delays in securing raw material and the failure on the part of the contractor to push the work as had been expected made it necessary for an extension of time from one date to another. It is doubtful if the pier will be ready for occupancy until early in the spring of 1917.

While the delay referred to has made it impossible to have any service from the pier up to the present time, indirect benefits have already come to manufacturers of New Bedford such as to make it clear that the construction of the pier will be abundantly justified.

Chapter 279 of the General Acts of 1915 took further recognition of the importance of State-owned piers in providing for the construction of a pier at Fall River along lines similar to those controlling the pier construction at New Bedford. The first act in connection with this work requires the city of Fall River to furnish the site, and while the actual purchase has not yet been made, the Commission is advised by the officials of Fall River that the same will be made so that contracts may be prepared some time during the coming year for carrying on this work.

Boston–Brockton–Taunton Canal.

In harmony with the rapidly developing sentiment throughout the United States for a greater utilization of important waterways for transportation purposes, the principal rivers of

Massachusetts have been given much attention by the Commission.

Studies that have been made at several different times relative to a canal in the southeastern part of the State, designed to serve the industrial centers in and about Taunton and Brockton, have been reviewed by the Commission and given careful consideration.

Another survey is being made at the present time touching a route that had not previously been considered, with the purpose of having the entire project carefully reviewed in connection with the different opportunities offered by the several different routes, in the hope that out of all the study made the Commonwealth may be able to present to the Federal authorities a plan for a canal in this section of the State that will offer cheap transportation and greatly improved service for the industries centering in this section.

Merrimack River Improvement.

Continuing the interest shown by the Board of Harbor and Land Commissioners in the development of the Merrimack River from the sea to Lowell, the Commission has held several conferences with Federal and other authorities interested, and records with great satisfaction the approval given to this project under date of Dec. 21, 1916, by the Chief of Engineers, U. S. A. There has already been appropriated by the Commonwealth $1,000,000, provided that no part of the same shall be available for expenditure until Congress shall approve a project, and make an appropriation therefor, to improve that portion of this river from the sea to opposite Ward's Hill, so that a continuous channel will be provided throughout this part of said river not less than 18 feet deep at mean low water and of adequate width.

While the original appropriation by the Commonwealth pledged the State to an expenditure of an amount that should equal that appropriated by the Federal government, undoubtedly careful consideration should be given to an extension of this policy to such an amount as would seem to be a serious drain upon the entire Commonwealth for improvements in a particular locality. In this connection reference may well be

made to the provisions of chapter 481 of the Acts of 1909, which permits cities and towns to appropriate money for the improvement of rivers, harbors, tidewaters and foreshores within its jurisdiction, and the payment of the money so appropriated to the State Treasurer, and its expenditure by the Harbor and Land Commission, now the Commission on Waterways and Public Lands.

Connecticut River Improvement.

While the problem of the Connecticut River is less purely local because of the control which the State of Connecticut has upon the situation, it is nevertheless one which has commanded for a long time the interest and study of Massachusetts authorities. The previous studies of the Harbor and Land Commission of Massachusetts and the special board, known as the Connecticut Valley Waterway Board, have already received the attention of the Federal authorities, as set forth in a report on this river by Maj. George B. Pillsbury, Corps of Engineers, U. S. A., under date of May 28, 1913.

A report of the Chief of Engineers, U. S. A., that the improvement by the United States of that part of the river between Hartford and Holyoke, to the effect that it is deemed advisable at an estimated cost of $1,870,000, subject to certain conditions, the depth of channel to be 12 feet at mean low water (the same depth which was recommended in the report of the special board named above), was made in 1915. It is understood that private parties stand ready to carry into effect certain water-power development at or near Windsor Locks to meet the government requirements, but the accomplishment of the entire project of improvement is dependent largely upon final action by Congress in relation to the conservation act.

The direct demand upon Massachusetts will naturally follow the above-indorsed improvements, but the importance of the great business enterprises located along the banks of the Connecticut River demand that the Commission should continue a careful study of all matters associated with a larger use of this important waterway, so that the part for which the State will ultimately be responsible shall be undertaken promptly and effectively at the proper time.

Taunton River Improvement.

The Commission has continued the interest of the department in further improving conditions for a more satisfactory use of the Taunton River from the standpoint of navigation. Through a personal visit to the locality itself, and a careful study of plans already prepared, the Commission is convinced that the position already taken by the Commonwealth in urging the improvement of this waterway is deserving of continued interest and support. A hearing held in Washington, at which the Board of Review reopened the question of further dredging in the river, was attended by the three members of the Commission. While no definite report has been made that guarantees to the State an appropriation by the Federal government for this work, the Commission believes that the Federal government may be relied upon to co-operate with the Commonwealth in working out improvements so clearly needed in this river.

Geological Survey.

The Commission recommends the appropriation by the General Court of $3,000 for paying a portion of the cost of obtaining by the United States Geological Survey of certain data in relation to water conservation, etc., for use in connection with the provisions of chapter 113 of the Resolves of 1915, for investigating the matter of conserving and equalizing the flow of water in rivers and streams of the Commonwealth. The Commission, in carrying out the provisions of the resolve aforesaid, is impressed with the importance of the subject and the necessity for the appropriation recommended.

Non-tidal Rivers.

The Commission believes it to be of great importance that careful consideration should be given to the question of placing non-tidal rivers more directly under the control of the Commission on Waterways and Public Lands in a way similar to the control over tidal rivers now exercised by the Commission under the law.

Great Ponds.

The great ponds of the Commonwealth are capable of much greater service to the citizens of the Commonwealth than they now afford. As a preliminary to a better understanding of what these ponds may provide in the nature of service, it is important that legislation should provide for a survey of the great ponds, probably to be more effectively carried on by the Commission on Waterways and Public Lands because there are already available in this department many important data upon that subject.

Other Recommendations.

In addition to the above matters, the attention of the Legislature is called to matters set forth for their consideration in bills embodying the following recommendations: —

To authorize the Commission to license certain structures in the non-tidal part of the Merrimac River.

To authorize the Commission to license certain structures in the Connecticut River.

To provide for the care and supervision of the Westfield River, Chicopee River, Deerfield River and Millers River.

To provide for the care and supervision of the non-tidal part of the Taunton River.

To authorize the Commission to make surveys of the great ponds of the Commonwealth.

Other recommendations and bills submitted are as follows: —

To provide for the establishment of the Port of Boston Development Fund, to make available the income from sales of land for industrial improvements; and a bill to provide that 2,000 copies of the annual report of the Commission shall be printed annually.

Public service to be efficient contemplates the greatest possible good to the largest possible number. Public service also, to be efficient, involves a co-relation of the rights, privileges, responsibilities and opportunities of the different branches that may be included in the activities of such an organization as the Commission on Waterways and Public Lands.

The creation of the Directors of the Port of Boston for the intensive study of Boston Harbor and the particular development of Boston Harbor was undoubtedly based upon the theory that Boston Harbor was a distinct and separate problem apart from the problem associated with all the other harbors and waterways in Massachusetts.

The consolidation of the work associated with Boston Harbor into the activities under the direction of the Commission on Waterways and Public Lands, who have a no less responsibility for all the harbors and waterways of the Commonwealth, would seem to restore Boston Harbor to its proper place in its relation to the other waterways and harbors of the State.

Boston Harbor is the great central shipping point, not only of Massachusetts but of all New England. It has, and always will have, the most important functions to perform coming under the direction of any commission having to do with any and all of the water service within the State. It undoubtedly has a right to command more attention, the expenditure of more money, the larger interest of the government, than has any other section of the State, but it is undoubtedly true that Boston Harbor alone cannot be of as great service to the entire State and New England as can Boston Harbor in connection with service to be rendered by other harbors, like New Bedford, Fall River, Lynn, Gloucester and Salem, which, if developed and improved properly, will have very close relations with the chief harbor of Boston itself.

The Commission on Waterways and Public Lands approaches the problem of making the harbors and waterways of Massachusetts of greater service to the people as a single problem, over which no single community has control, but in connection with which the co-operation of all the communities, one with the other, —the co-ordination of all the activities, one with the other, — can result in a greater service for all.

The work of reorganizing public service is made more difficult because of the manner in which it affects loyal workers and honest public officials who have been led to expect permanent employment by nature of their appointment. Many men

and women have been dropped from the departments of service taken over by the Commission on Waterways and Public Lands because there was no longer available work to justify their employment. In every case they have been dropped without prejudice, and have left the service of the department with excellent records and with the best wishes of their superiors and associates.

For the unfailing courtesy and loyalty of those who have helped in the work of reorganizing, the present members of the Commission desire to here record their appreciation.

Details of Work.

The following statements set forth in more detail the doings of the Directors of the Port of Boston, the Board of Harbor and Land Commissioners, and the Commission on Waterways and Public Lands during the year ending Nov. 30, 1916.

The word "Directors" as used in the following pages refers to the Directors of the Port of Boston; the word "Board" to the Board of Harbor and Land Commissioners; the word "Commission" to the Commission on Waterways and Public Lands.

BOSTON HARBOR.

The Commonwealth Flats at South Boston.

Commonwealth Pier No. 5.

The work of reconstructing this pier and shed was completed by H. P. Converse & Co. on Dec. 1, 1914.

Claims amounting to $212,091.90 were filed by H. P. Converse & Co. against the Commonwealth on account of work done by them under contract with the Directors in the reconstruction and equipment of this pier. At the end of the year 1915 these claims were still before the Attorney-General. April 12, 1916, a recommendation for a settlement for $47,224.77 was made by the Attorney-General, and payment of this amount was approved by the Directors April 25, 1916, in full settlement of all claims on account of this contract.

In October, 1916, the Commission made inspection of this pier, and on Nov. 6, 1916, entered into a contract with the W. A. Snow Iron Works, Inc., to construct the necessary iron ladders and steps to reach the roof of the shed for the sum of $1,315. This work is now in progress.

The inspection by the Commission shows that considerable money will be required in the immediate future, not only to maintain the property but to supply additional equipment not provided in the original contract.

An account of the business transacted at this pier during the year is printed in the Appendix.

Freight Rates in Connection with the State Piers.

When the Commonwealth, by chapter 748 of the Acts of 1911, established the Directors of the Port of Boston and authorized them to establish and operate piers and docks, one of their first acts was to contract with the New York, New Haven & Hartford Railroad Company for the cancellation of the lease of Commonwealth Pier No. 5 and the adjacent lands

and flats; and one of the provisions of that agreement was that the New Haven railroad and the Boston & Maine railroad should make the same charge for the transportation of freight to and from the Commonwealth Pier that they did to their own piers in Boston Harbor, and that in addition they would pay the Commonwealth 10 cents per ton for all freight shipped to and from said pier along either of said railroads.

Since that time there have been many changes in freight rates and orders of the Interstate Commerce Commission, the result of which has been generally to increase the charges for transportation of freight to and from the Commonwealth Pier, and in the case of the Boston & Maine railroad, to make the charge much greater to the Commonwealth Pier than to its own piers.

During the early portion of the year 1915 a study of these matters was made and a report submitted to the Directors on July 18, 1915, by Robert Rantoul.

Another complication arising out of this agreement developed when on Dec. 19, 1914, the National Dock and Storage Warehouse Company filed a complaint with the Interstate Commerce Commission that it was unjustly discriminated against because the same terms were not given on freight to and from its wharf as were given by the Boston & Maine railroad to goods taken to and from the Commonwealth Pier. The result of this was a determination by the Interstate Commerce Commission, on March 20, 1916, that the practice by the Boston & Maine railroad was unduly prejudicial to the warehouse company and in violation of the Interstate Commerce Act, and the railroad company was ordered to cease and desist on or before May 18, 1916, and for two years thereafter, from said violation.

By the provisions of chapter 383 of the Special Acts of 1915 a joint board, consisting of the Public Service Commission, the Attorney-General and the Directors of the Port of Boston, was created to investigate and report, on the first Wednesday of January, 1916, in relation to the cost of shipments to and from the piers of the Commonwealth at South Boston.

The matter was considered by said joint board and a draft of a report prepared, which was later revised by the Attorney-

General and submitted to the Directors of the Port of Boston in May, 1916. It appears that no further action has been taken on this matter.

Commonwealth Pier No. 6 (Fish Pier).

All the work of construction of Commonwealth Pier No. 6, known as the Fish Pier, and leased to the Boston Fish Market Corporation, which was to be done by the Commonwealth, was completed Oct. 30, 1914.

On Feb. 23, 1915, the Boston Fish Market Corporation, through its attorneys, filed with the Directors a petition and brief in relation to the claim of the corporation, amounting to $94,984.90, for damages, loss of rent, revenue, etc., caused by delay to their construction operations on the pier. This claim being in excess of the amount the Directors considered reasonable, after various conferences, extending over a period of almost a year, between the Directors and the attorneys for the corporation, it was decided to submit the matter to arbitration. The amount of claims as finally submitted to the arbitration board was $113,469.90. The majority of this board reported on Dec. 28, 1915, that the amount due from the Commonwealth was $57,934.15, and the minority member of the board reported that the amount due was $17,500. These reports were duly considered by the Directors in consultation with the Attorney-General, and finally, with the approval of that official and the Governor and Council, the claim was settled by the payment of $55,000, and a release executed by the corporation accepting the same in full settlement of all claims.

The Northern Construction Company, which under contract with the Directors dated June 3, 1913, had constructed sewers and drains, laid water pipe and paved the surface of the pier and a portion of Northern Avenue and D Street adjoining, filed with the Directors in March, 1915, claims for damages caused by "delays, changes in plans and improper sequence of operations." The claims, amounting to $14,485.70, were referred to Guy C. Emerson by the Directors on Oct. 22, 1915. Mr. Emerson reported on Dec. 30, 1915, that there was due the sum of $4,857.23, and in addition a bill for other work, amounting to $968.50, was also, in the opinion of the Attorney-

General, due the company. With the advice of the Attorney-General and the approval of the Governor and Council the claim of this company was settled by the payment of $5,500, and a release of all claims was executed by it.

Dry Dock.

The Directors state in their annual report for 1915 that on Oct. 13, 1915, the contract which had previously been awarded to Holbrook, Cabot & Rollins Corporation for the construction of the dry dock was approved by the Governor and Council. The contractor immediately began to construct buildings and fences and assemble plant, and on Nov. 13, 1915, began to excavate material from the dry dock site by dredging. The total estimated cost of this contract, including the intermediate sill, is $1,865,157.25.

The Commission reports that the contractor has now completed the dredging of the dock site and so much of the approach channels as could be done and yet leave enough material to do the back filling. While this work was in progress the construction of a cofferdam to close the easterly end of the site so that the area to be occupied by the dock could be unwatered was commenced, and as soon as the dredge was removed the opening was closed, and on June 22, 1916, the gates were closed and the pumping commenced. At the time the gates were closed the embankments supporting the timber work had not been completed. The contractor continued work towards completing the dam, but the material used not being satisfactory, the gates were opened and the tide again allowed to fill the dock area. On July 10, additional work having been done on the embankments, the contractor again closed the gates in the sluiceways and began pumping, at the same time continuing work on the embankments, using gravel and stone instead of the clayey material which had been used previously. On the evening of July 25, 1916, at high water, the tide overtopped a portion of the still unfinished cofferdam, making a breach through which the dock area was again filled. The sluice gates were also opened, and the tide was allowed to flow

freely in and out of the basin. At the time the break occurred the surface of the water in the dock area had been lowered to about 8 feet below mean low water. The contractor at once commenced repairs to the cofferdam, but in a short time ceased work in order that further investigations might be made, but later recommenced his work and completed the dam, and has unwatered the site, so that on Dec. 1, 1916, he was nearly ready to proceed with further excavation.

During the progress of the work various studies and investigations had been made as to the probable difficulties to be encountered and the permeability and stability of the material and soil in which the dry dock is to be located. Messrs. Joseph Ripley and Mortimer G. Barnes, civil engineers of Albany, N. Y., who have had large experience in cofferdam and similar work, were employed to report on the various features of the work, and the investigations were carried out under their direction. Twenty wash borings were made, eight of these having 6-inch pipe casings, the borings being done with a cyclone drill. The others were made with the ordinary 2-inch pipe casing and hand drills. All the 6-inch casings were left in place, and the elevation of the ground water has been determined from time to time by these wells. In addition to the pipe wells, a test pit was excavated to the ledge at a point about 200 feet south of the center line of the dock and 400 feet from the inner end.

During the year, from $60,000 to $70,000 worth of cut granite for facing the walls of the dock has been delivered at the dock site, and a large part of the necessary plant for handling the work has been erected, including railroad tracks, locomotives and cars, a cableway spanning the dock excavation, and a number of cranes, derricks and small plant.

Up to Dec. 1, 1916, there had been paid the contractor the sum of $99,645.76.

The Directors in 1915 made a location for an avenue extending from Summer Street to the dry dock area, parallel to the Reserved Channel, with its southerly side 285 feet from the sea wall of that channel. In connection with the work on the dry dock, the city of Boston has laid in the above-described avenue a 12-inch water main from Summer Street to the dry

dock site, and the Edison Electric Illuminating Company has laid underground conduits in the same location. These will be used first for supplying the contractor with water and electricity for carrying out the construction work, and will be later ready for use in connection with the operation of the dock.

Railroad Freight Yard.

The Directors stated in their annual report for 1915 that "Our predecessors in office contracted for the construction of a railroad freight yard contiguous to the Commonwealth piers and lying between Summer Street on the south, the property formerly leased by the Staples Coal Company on the east, Northern Avenue on the north and the property of the New York, New Haven & Hartford Railroad Company on the west. The cost of this construction, which was completed at about the time the members of the present Board took office, was in excess of $100,000.

"The trackage is about 6 miles in extent and can accommodate between 400 and 500 cars. The area used for this purpose consists of about 15 acres of land, and is one of the most valuable areas on the Boston water front. Because of this fact it seems reasonable to estimate the land used for this purpose as having a value of not less than $1,500,000. The primary purpose of this yard is to serve Commonwealth Pier No. 5, the Fish Pier and the properties owned by the Commonwealth and leased to the Staples Coal Company, the Metropolitan Coal Company, the Boston Molasses Company and the area set aside for the dry dock and the machine repair shops which will be attracted there. Secondarily, the yard would be used by the New Haven road for storage of freight cars not engaged in traffic to or from the properties just mentioned.

"When the question of maintenance of this yard, estimated to amount to $20,000 annually, arose, the New Haven road claimed that it should have the exclusive use of this valuable property in return for the cost of upkeep and maintenance, basing this on the assumption that the yard was designed primarily to serve the piers of the Commonwealth.

"The Port Directors believe that the necessary facilities for handling the traffic received by the railroad from the steam-

ship lines should be supplied by the railroad. In this case the Commonwealth has equipped with tracks a particularly desirable area for the railroad purposes of the New Haven road, and the Port Directors believe that railroad should assume at the very least one-half of the interest expense involved and the maintenance of the yard. In consequence, the Board has suggested to the railroad that a fair appraisal be made of the value of this railroad yard property, figuring the interest on this investment at 4 per cent. plus the cost of maintenance, and that one-half of this sum be paid annually to the Commonwealth as rental, with the agreement that the use of the yard shall be devoted primarily to the business received from the Commonwealth properties, and that such surplus space as is left may be used for yard purposes by the New Haven railroad. The New Haven railroad authorities have not yet approved of this suggestion, nor have they made any proposition other than as stated which the Directors feel that they can accept."

The Commission reports that this important subject received early attention, and negotiations were reopened with the railroad officials, resulting in the execution of an agreement, under date of Nov. 15, 1916, between the Commonwealth and the New York, New Haven & Hartford Railroad Company which authorizes this company to use the surplus capacity of this freight yard for a term of ten years, with the privilege of renewal for another ten years under certain conditions providing that the railroad company is to assume the care and maintenance of the storage tracks and pay the State $14,000 per year, less certain costs not properly chargeable to ordinary maintenance. Under this agreement the railroad company is now using this freight yard and doing the necessary work of keeping the tracks in the storage yard in proper repair.

Installation of Street Railway Tracks across Viaduct.

The Directors state in their annual report for 1915 that "in accordance with authorization contained in chapter 363 of the Special Acts of 1915, the Directors have taken steps toward the installation of tracks of the Boston Elevated Railway Company

from Summer Street across the viaduct to Commonwealth Pier No. 5; also upon the ramp leading from the viaduct to D Street and to a point on Northern Avenue near Commonwealth Pier No. 6.

"Tentative agreements have been outlined between the Commonwealth, the Boston Fish Market Corporation and the Port Directors for the construction and use of these tracks.

"Legal difficulties have arisen which prevent the construction of these tracks by the Boston Elevated Railway Company for the Commonwealth. The Directors are considering the award of a contract for the installation of these tracks by the Commonwealth."

The Commission reports that it has taken up this matter with officials of the Boston Elevated Railway Company, has considered various plans for the necessary construction, including one for building a single track from the existing tracks in Summer Street across the viaduct and down the ramp to and across D Street, with a loading platform for the accommodation of trolley freight on the easterly side of D Street, utilizing the existing freight yard track on the southerly side of the ramp for loading the trolley freight cars. Details of the proposed contract are now under consideration.

Northern Avenue Bulkhead.

The Directors, on April 17, 1916, entered into a contract with the W. H. Ellis & Son Company for the construction of about 1,000 linear feet of pile and timber bulkhead near the northerly line of Northern Avenue and extending from the filled section at that time of said avenue easterly to a connection with the existing bulkhead at the dry dock site, excepting across the docks at the property occupied by the Metropolitan Coal Company and the Boston Molasses Company.

The Commission reports that work was commenced May 20, 1916, and was substantially completed Nov. 30, 1916, there having been about one month's delay on the part of the contractor, occasioned by his inability to obtain promptly all the

timber and piles required. The total length of structures built amounts to 1,002.6 linear feet, and the total expenditure to Dec. 1, 1916, was $15.494.05. The filling of the area inclosed by this bulkhead commenced Nov. 1, 1916.

Industrial Tracks South of Summer Street.

In the development of the property of the Commonwealth south of Summer Street, the Directors on April 30, 1914, adopted a plan for the location of streets and railroad tracks by which the property would be served by tracks running north and south parallel with C, D and E streets and connecting with the tracks of the New York, New Haven & Hartford Railroad at First Street, west of B Street. Nothing has been done towards the construction of these tracks except negotiations with the railroad officials, who have suggested various modifications of details.

The Commission reports that recently a number of applications for the construction of a portion of these tracks have been made. In order to complete the tracks as designed it will be necessary to discontinue in whole or in part the use by the city of Boston of what is known as the Commonwealth playground, which is now being used by the city under the provisions of chapter 421 of the Acts of 1891.

Sale of Land, and Right to use Industrial Tracks.

On May 22, 1916, the Directors sold to Lowe Brothers Company of Dayton, Ohio, a lot of land at the corner of Egmont and C streets at South Boston, together with the right to use, in common with other abutters, the section of Egmont Street 50 feet wide adjoining the premises on the north. There was further sold to said company the right to connect with and use such industrial tracks as may be built in the rear of the premises sold. The price received for the lot, with 80 feet frontage on C Street, was $2.50 per square foot, which included the payment for the use, in common with other abutters, of an area on Fargo Street. For the right to connect with and use the industrial track a payment of 2 cents per square foot on the area of the lot 80 feet front on C Street was made.

Fargo Street Sewer.

On Dec. 31, 1915, a contract was entered into by the Directors with James H. Ferguson for building a sewer in Fargo Street between C and D streets, to furnish sewer connections to the lot of land sold by the Directors to the Colonial Steel Company. Work was completed May 11, 1916, at a total cost of $3,355.43, of which $402.97 was paid by the said company.

Reserved Channel.

The location chosen for the construction of the dry dock at South Boston made necessary the relocation of the channel leading to L Street bridge. Under chapter 90 of the Resolves of 1911 and chapter 748 of the Acts of 1911, the Directors in 1913 relocated this channel, and it now extends in a straight line from L Street bridge to the United States pier and bulkhead line, in a direction parallel to the street system of South Boston and the center line of the dry dock location.

Under two contracts entered into by the Directors in 1913, 35 acres of flats adjacent to the dry dock site were reclaimed, and a straight channel, 300 feet wide, extending from the L Street bridge to the main ship channel, was excavated to a depth of 30 feet at mean low water, making accessible to the sea the filled areas of the Commonwealth, as well as large areas in private ownership on the southerly side of the relocated channel.

Dredging off Pier No. 2, South Boston.

On Aug. 29, 1916, the Commission was informed by the Merchants and Miners Transportation Company that the depth of water in the approaches to Pier No. 2 at South Boston had shoaled to such an extent that it obstructed their steamers approaching the pier. An examination was made by a survey of the harbor in the immediate vicinity of the pier, and it was found that where the harbor had originally been dredged to the depth of 23 feet at mean low water it had shoaled, so that in places there was but 18 to 20 feet at mean low water. A large part of the shoaling was within 50 feet of the end of the pier.

Conference was held with the officers of this company at which it was agreed that the area in front of the pier and for a distance of 150 feet from the pier should be dredged, the Commonwealth to pay the cost of dredging the outer 100 feet and the company to pay the cost of dredging inside a line 50 feet from the end of the pier.

On Oct. 23, 1916, a contract was made with the Bay State Dredging and Contracting Company to do the work, and the same was completed Nov. 2, 1916, material to the amount of 4,323 cubic yards having been dredged and disposed of, at a cost of $2,039.04, of which amount $604.80 was paid by the Transportation company.

The Commonwealth Flats at East Boston.

The Directors set forth in their annual report for 1915 that "By chapter 334 of the Special Acts of 1915 the Legislature adopted the harbor lines proposed by the Directors for the comprehensive development of Boston Harbor. By the adoption of these lines large areas of State flats were made available for reclamation. A large portion of the area between Jeffries Point and Governors Island, known as Bird Island Shoal, is exposed at low tide, and its present condition serves no useful purpose. The material underlying this shoal is compact, and expensive to dredge, but is composed of excellent material for the foundation of pier structures. By the dredging of docks, pier structures 1,600 feet in length may here be constructed at a low foundation cost, and their proximity to the main ship channel reduces to a minimum the cost of dredging approaches.

"North of the area reserved for the construction of piers and the dredging of docks there exists within the bulkhead lines an area 1,500 feet wide and 7,000 feet in length, connecting the mainland at Jeffries Point with Governors Island. This vast area is the property of the Commonwealth, and is now available for reclamation and use for industrial and maritime purposes.

"By permission of the Secretary of War the Directors have been allowed to deposit material within these areas by the

award of contracts and the issuance of permits. Lighted pile ranges have been maintained by the Directors to outline the dumping ground and its approach channel."

The Commission reports that on June 30, 1916, the Secretary of War finally approved the establishment of United States pierhead and bulkhead lines on the East Boston flats substantially in the location of the State lines established by chapter 334 of the Special Acts of 1915. While this action was pending, a large amount of material was dumped on the flats inclosed by the bulkhead lines under permits from the Secretary of War. During the year 974,223 cubic yards were dumped, mainly in the channels north of Governors Island.

In order to guide the scows and keep them within the limits of the dumping ground, piles were driven to mark the limits of the basin and at night it was necessary to keep these lighted. The cost of erecting, maintaining and lighting these piles amounted to $1,363.84. Also, in view of the fact that the cost of towing material and dumping it at East Boston was less than the cost of towing it to sea, especially in rough weather, a charge varying from 1 cent to 3 cents per cubic yard has been made for the privilege of dumping on the flats and in the channels at East Boston. The total amount received to Dec. 1, 1916, for this privilege, is $17,729.08.

It was deemed advisable to provide additional opportunity to dispose of dredged material inside the harbor, both because the cost of dumping at East Boston is less than taking material to sea, and also because there is danger that the entrance to the harbor may be obstructed by the dumped material if great care is not used in dumping it. It was also desirable to use the material to make land to be used as terminals and docks. Accordingly, a contract with the Bay State Dredging and Contracting Company was entered into under date of Nov. 29, 1915, for building a pile and timber bulkhead 2,200 feet in length, extending easterly from Jeffries Point, and its supporting embankments. This work was completed Sept. 20, 1916, at a total cost of $75,488.32. As large quantities of material were being dredged in various portions of the harbor, by

the Commonwealth, by private parties and by the United States, the Directors entered into a contract on March 14, 1916, with the Atlantic, Gulf and Pacific Company, for dredging, depositing and levelling at street grade 1,070,000 cubic yards of material on the East Boston flats. The area to be filled lies northerly of and adjacent to the bulkhead which was built under the above contract with the Bay State Dredging and Contracting Company, which protects the fill on the harbor front. Work under this contract was started May 15, 1916, and proceeded so rapidly that by Nov. 1, 1916, practically the whole amount of material authorized by the contract had been dredged and deposited on the area to be filled. This work was so conducted that the channel west of Apple Island, extending from the main harbor to the Winthrop shore, which had been filled in by the dumping, was reopened for navigation.

The Commission found that under the existing contract all the material to be brought from Mystic River could not be rehandled at East Boston, and that there was no other available place where it could be deposited inside the harbor. As it was deemed desirable that this material should be retained in the harbor and used for filling the flats at East Boston, instead of being taken to sea, especially as the cost under the contract was 3 cents per cubic yard less for delivering at East Boston than for taking it to sea, the contract for rehandling material at East Boston was extended by the Commission by a supplemental contract dated Oct. 6, 1916, to provide for the handling of from 2,000,000 to 2,500,000 cubic yards in addition to the 1,070,000 cubic yards authorized by the original contract. Under these two contracts the work of filling the flats at East Boston has progressed rapidly. Up to Dec. 1, 1916, material to the amount of 1,371,828 cubic yards had been rehandled, and there had been paid to the contractor $195,388.52. About 20 acres of flats have thus been filled to grade.

The Commission further reports that under chapter 486 of the Acts of 1897 the Board of Harbor and Land Commissioners made a taking in October, 1898, of about 100 acres of land and flats on the easterly side of East Boston, mainly the property of the East Boston Company. Settlements were made with all

the other owners except this company shortly after the taking. The Directors of the Port of Boston, in 1913, acting under chapter 748 of the Acts of 1911, also made a taking of an adjoining area of land and flats which was also mainly the property of said company. Settlement with most of the other owners has been made. Negotiations were carried on resulting in the approval by the Attorney-General and the Directors of the payment by the Commonwealth of the sum of $579,734.11, covering both claims of the East Boston Company. Of this amount, $65,392.81 was paid from the Harbor Improvement Loan under the act of 1897 aforesaid, and the balance, $514,-341.30, from the $9,000,000 appropriated in 1911 for the development of the port of Boston.

Commonwealth Pier No. 1, East Boston.

In 1913 the Directors took from the Boston & Maine railroad, by right of eminent domain, the property known as the Eastern Railroad Pier at East Boston. Plans and specifications for the construction of a two-story freight and passenger pier at this site were prepared, and a contract was awarded to Woodbury & Leighton Company on June 22, 1914, for $658,857 for foundations, superstructure and a portion of the pier equipment. The award of this contract was not approved by the Governor and Council. The total estimated cost of the pier, including land and dredging, was about $1,750,000.

A contract was awarded to the Bay State Dredging Company on Jan. 15, 1914, for dredging both within and outside the docks.

This contract included the dredging of the berths alongside the pier to a depth of 40 feet at mean low water.

Dredging under this contract was started at once, and was to have been completed on Oct. 1, 1914, but the contractor was allowed to delay his work pending a definite decision as to the particular development to be made by the Directors at the site.

Because of the uncertainty of the particular development of this property, the Directors at the end of the fiscal year 1914 decided to terminate work under the dredging contract after the Bay State Dredging Company had removed all shoals outside

the United States pierhead line projecting above a plane 35 feet below mean low water, and the removal of these shoals was in progress at the end of the year 1914.

The Commission reports that the work was completed, so far as it was deemed desirable, on Dec. 22, 1915, the total amount excavated under this contract being 396,569 cubic yards, at a total expenditure of $62,241.96.

The Commonwealth has expended in acquiring this property and for all other purposes, up to Dec. 1, 1916, $827,241.96.

Anchorage Basin, Repair of Dolphins.

The dolphins which were built and placed by the Directors, and are now maintained by the Commission, to mark the northerly edge of the anchorage basin at Bird Island, were injured during last summer by vessels striking them. The Commission in October, 1916, arranged with the Bay State Dredging and Contracting Company to make the necessary repairs for the sum of $200.

Work was completed early in November, 1916.

Hayward's Creek.

In September, 1916, the Commission concluded that it would be to the advantage of the Commonwealth to establish a terminal in Weymouth Fore River at Hayward's Creek in the city of Quincy and town of Braintree, southerly of property of the Fore River Shipbuilding Corporation, under authority of chapter 748 of the Acts of 1911, and on Oct. 19, 1916, voted to approve the taking of land at Hayward's Creek and an agreement in connection therewith whereby the Commonwealth would be guaranteed an income from said terminal property. The action of the Commission was approved by vote of the Governor and Council Oct. 19, 1916. Surveys were at once commenced, and on Nov. 24, 1916, a report and plan showing and describing the land which it was proposed to take were prepared by the engineer, who was instructed to make studies and suggest a method for developing this territory. This matter is now under consideration.

Boston Harbor 35-Foot Channel.

Operations by the Federal Government.

The condition of the 35-foot channel is as follows: From the sea through Broad Sound to President Roads there is an available navigable depth of 35 feet at mean low water, but the channel is obstructed by some shoals which are now being removed. From President Roads to Commonwealth Docks the channel has a depth of 35 feet throughout and from Commonwealth Docks to the navy yard it has an available navigable depth of 32 feet but is obstructed by a few shoals, which will be removed during the present season. Above the navy yard, both at the mouth of the Charles River, Mystic River, and Chelsea Creek the channel has shoaled in some places to the extent of several feet but these parts of the channel are not used at present by vessels requiring any greater depth than exists at present.

In all the other channels covered by the existing project, substantially the full project depths are available.

Local cooperation. — No conditions have been imposed by law in connection with the main ship channels. The Commonwealth of Massachusetts has voluntarily dredged an anchorage basin 30 feet deep at mean low water, about 1 mile long and 1,000 feet wide, off Bird Island Flats immediately adjoining the 35-foot channel on the East Boston side; has built on the flats owned by it at South Boston adjoining the 35-foot channel the Commonwealth pier, 1,200 feet long and 400 feet wide, with berths on either side 40 feet deep at mean low water, and provided with all the equipment necessary to make it a first-class terminal for the largest freight and passenger vessels; a pier for the fishing interests; three short pile piers with a frontage of 700 feet; and is constructing a dry dock large enough to take in any vessel now built or proposed. At East Boston the Commonwealth has acquired a site for a steamship pier, the construction of which has not been commenced. The expenditures for the harbor by the Commonwealth, already made and provided for, total about $15,000,000.

Effect of improvement. — The channels as improved have effected no reduction in freight rates but the completion of the 35-foot channel has resulted in establishing new trans-Atlantic steamship lines. Between 1902 and 1914 the steamships using this port increased in carrying capacity from 4,500 to 6,000 tons dead weight to 8,000 to 12,000 tons dead weight, and drawing from 29 to 33 feet fully loaded; the foreign commerce from $165,000,000 in round numbers to $235,000,000; and the tonnage of the shipping, foreign and coastwise, from 9,906,748 net tons to 15,285,992 net tons.

Proposed operations. — It is estimated that the funds available will suffice for completing the repair of the seawalls and such maintenance dredging in the 35-foot channel as is now necessary; and for maintaining the survey and inspection boats, engineering expenses, rent of wharf,

etc., to June 30, 1918. The funds in hand for Chelsea Creek will be held for future maintenance. The other channels are in good condition and no operations are proposed.

Recommended modifications of project. — In House Document No. 931, Sixty-third Congress, second session, the Chief of Engineers reported that the further improvement of Boston Harbor is deemed advisable to the extent of providing a channel between President Roads and the sea, on the lines recommended by the district officer and indicated on the accompanying map, 900 feet in width, widening to 1,100 feet at the outer end, 40 feet deep at mean low water in general, but 45 feet deep through rock; and the construction of a dredging plant, at a total estimated cost of $1,545,000; and that the initial appropriation should be $400,000 in cash, with contract authorization for the remainder.

Malden River.

By chapter 231 of the General Acts of 1916 the Directors were authorized to convey and accept land and flats in connection with the proposed improvement of Malden River by the Federal government.

The Commission reports that correspondence has passed between it and the parties in interest, including the district engineer officer stationed at Boston, with respect to the necessary releases required by this act and as preliminary to further action by the Federal government looking to the improvement of this river under the provisions of the River and Harbor Act approved March 4, 1915.

Up to Dec. 1, 1916, however, all the documents needed to meet the requirements of the engineer officer were not in completed form for delivery.

Operations by the Federal Government.

Operations and results during the fiscal year. — No operations were in progress and no expenditures made.

Condition at the end of fiscal year. — Under the previous project, completed December 4, 1897, by dredging a channel was obtained 100 feet wide and 12 feet deep at mean high water from the mouth of the river to the Medford Street bridge, 1.6 miles, and has since been maintained. Under the existing project, work has not been commenced and no expenditures have been made. The net total of results accomplished under the previous and existing projects is, therefore, a channel 100 feet wide

and 12 feet deep at mean high water from the mouth of the river to the Medford Street bridge, to which point the river is actually navigated at ordinary high water by coal barges drawing 10½ to 11 feet.

Local cooperation. — The conditions imposed by the river and harbor act of July 25, 1912, adopting the project, and the river and harbor act of March 4, 1915, authorizing a modification in it, were that the riparian owners should give proper permits to dump spoil on their lands behind dikes and release the United States from all claims for damages by settling or caving of banks into the dredged channel, and upon the Commonwealth of Massachusetts lowering the siphon of the metropolitan sewer and pledging itself for all costs of maintenance of the new channel, and that any increase in cost because of any modified plan shall be paid for by local interests and involve no further appropriation by the United States for the prosecution or completion of the improvement. These conditions were accepted by the Commonwealth by act approved April 29, 1915. The new sewer siphon has been laid and the removal of the old siphon will probably be completed in the early fall.

Effect of improvement. — No work has been done on the improved project, but the improvement by the previous project is reported to enable the smallest barges, or larger barges with partial cargoes, to deliver coal at Malden, saving the cost of lightering — 50 cents per ton.

Proposed operations. — Of the $80,200 available, $80,000 represents the amount which was appropriated for the existing project and which will be sufficient for its completion. The work, however, is delayed pending the removal of the old sewer siphon referred to under the heading *Local cooperation.* The remaining $200 is the balance of an allotment to Malden River of a joint appropriation for Mystic and Malden Rivers, applicable either to Malden River or Mystic River (upper).

Recommended modifications of project. — None.

No work was done and no expenditure made, pending fulfillment of the conditions imposed in the acts of Congress adopting the project.

Mystic River.

By chapter 337 of the Special Acts of 1915 the Directors were authorized to dredge approaches to the relocated draw in Malden bridge over Mystic river. A contract for this dredging was awarded on Aug. 17, 1915, to J. P. O'Riorden, at 11⅛ cents per cubic yard.

Under date of March 8, 1916, the Directors entered into a contract with the Maryland Dredging and Contracting Company to dredge about 450,000 cubic yards in Mystic River at the middle ground opposite Mystic Wharf, the contract price being 11.85 cents per cubic yard.

By chapter 253 of the General Acts of 1916 the Directors were authorized to deepen and improve the channel of Mystic River, between Chelsea bridge and Malden bridge, and an appropriation of $75,000 was made from the Development of the Port of Boston Loan Fund and $200,000 from the principal of the Harbor Compensation Fund. On June 27, 1916, the Directors entered into a contract with the Maryland Dredging and Contracting Company to dredge 1,750,000 cubic yards of material for the purpose of deepening, to a depth of 30 feet at mean low water, the channel of this river extending from the channel already dredged from a point opposite the mouth of Island End River at the end of the channel previously dredged up to a point opposite the northeasterly corner of the Charlestown Playground, the contract price being 15.95 cents per cubic yard for all material which is taken to sea, and 12.95 cents per cubic yard for all material which is deposited at the receiving basin of the Commonwealth on the easterly side of East Boston.

The Commission reports that under the contract of Aug. 17, 1915, aforesaid, work was completed Dec. 13, 1915, material to the amount of 35,829 cubic yards having been excavated, at a total cost of $3,707.85.

Under the contract of March 8, 1916, aforesaid, work commenced April 24, 1916, and the shoal was substantially removed by Aug. 6, 1916, there remaining only a few shoal spots left by the dredge. Since that date the contractor has gone over the area with a smaller dredge and removed most of the shoals, but a few still remain. Up to Dec. 1, 1916, material to the amount of 399,367 cubic yards has been removed and $40,336.74 paid the contractor.

Under the contract of June 27, 1916, aforesaid, work commenced Sept. 6, 1916, and up to Dec. 1, 1916, material to the amount of 352,418 cubic yards has been dredged and deposited at the Commonwealth's receiving basin at East Boston, the total amount paid the contractor to that date being $37,559.45. All material removed under this contract has been, and in future will be, deposited at the receiving basin aforesaid,

arrangements having been made under another contract to rehandle material and thus build up the flats adjoining Jeffries Point as fast as material is delivered. This contract provides for the completion of work by Feb. 1, 1918, but in all probability it will be accomplished before that date.

Operations by the Federal Government.

MYSTIC RIVER, AND MYSTIC RIVER BELOW THE MOUTH OF ISLAND END RIVER, MASS.

(*A*) *Mystic River.*

Operations and results during the fiscal year. — No operations were in progress and no expenditures made.

Condition at the end of fiscal year. — By dredging, a channel of the projected dimensions was completed in November, 1906. A survey in May and June, 1916, shows that the portion of the channel normally 6 feet deep now has an available navigable depth of but about 4½ feet at mean low water and that while the portion of the channel normally 4 feet deep has that depth throughout its length, the width is contracted by caving of the banks. The expenditures were $28,794.88 for new work and $250 for maintenance, a total of $29,044.88. At Cradock Bridge, Medford, 5 miles above the mouth of the river, is a dam built and maintained by the Commonwealth of Massachusetts. The river at this point is 110 feet in width. The dam includes a boat lock 60 feet in length, canoe rollway, weirs which ordinarily will automatically regulate the height of the water above the dam, and sluice gates operated by electric motors, for use when needed. The dam is intended to completely exclude tidewater and maintain the level of the river above the dam at a grade about 3 feet below mean high water and with a navigable depth varying from 7 feet at the dam to 4 feet at the Lower Mystic Lake. Data concerning lock:

Dimensions: 15 feet wide, 45 feet long.
Lift: 6.3 feet above mean low water.
Completed: 1909.
Cost: Unknown.

Local cooperation. — None.

Effect of improvement. — It is reported that barges of the lightest draft remaining in service deliver coal at Medford without the expense of lightering, which would be about 50 cents per ton.

Proposed operations. — No funds are available. A recent survey shows that the channel has deteriorated and requires redredging almost throughout its entire length, for which the following estimate is submitted for the year ending June 30, 1918:

73,000 cubic yards (scow measurement), allowing for 1.5 feet overdepth, at 30 cents per cubic yard,	$21,900
Engineering and contingencies, 10 per cent, say	2,100
	$24,000

Recommended modifications of project. — None.

(*C*) *Mystic River below the Mouth of Island End River.*

The section included under this subheading (C) extends from the mouth of Island End River 2,700 feet downstream through the Chelsea (north) Drawbridge, where the river enters the 35-foot channel in Boston Harbor.

Existing project. — The existing project provides for a channel 30 feet deep at mean low water from the mouth of Island End River through the Chelsea (north) Bridge to the 35-foot channel of Boston Harbor, a length of about one-half mile. The channel has a width of 600 feet at the upstream end, gradually narrowing to 300 feet, with widening of the entrance channel leading to Mystic Wharf, at an estimated cost of $172,000, and annual cost of maintenance not exceeding $2,000. (H. Doc. No. 1086, 60th Cong., 2d sess., accompanying which is the latest published map.) The project was adopted by the river and harbor act of June 25, 1910. The mean tidal variation is 9.6 feet.

Operations and results during the fiscal year. — By hired dredging plant, under contract and under lease, all shoals in the 30-foot channel were removed, a total of 46,695 cubic yards being dredged, at an expenditure of $10,313.94, all for maintenance.

Condition at the end of fiscal year. — The net total of results accomplished in the improvement of the river below the mouth of Island End River, under the previous and existing projects, is a channel 30 feet deep at mean low water from Island End River downstream through the Chelsea (north) Bridge to the 35-foot channel in Boston Harbor, 600 feet wide at the upstream end, gradually narrowing to 300 feet, with a widening of the channel above the bridge on the western edge to adapt it to the openings in the draw span of the new bridge built by the city of Boston, and a widening of the entrance channel to Mystic wharf.

Local cooperation. — No conditions have been imposed by law. The Commonwealth of Massachusetts in 1914 dredged two areas in front of Mystic Wharf, one to the depth of 20 feet and the other to the depth of 30 feet at mean low water, at an expenditure of $15,957.52; in 1915 the 20-foot area was enlarged, and deepened to 30 feet at mean low water, at a cost of $5,927. Dredging to the depth of 30 feet at mean low water of the area known as the "Middle Ground," lying between the 30-foot Government channel and Mystic Wharf, was commenced by the Commonwealth in April, 1916.

Effect of improvement. — It can not be ascertained that any material reduction in freight rates has been effected by the improvement, but it is

of great advantage to shipping interests in permitting utilization of larger vessels.

Proposed operations. — The funds available will be retained until additional maintenance work becomes necessary, and being sufficient for any such probable work in the near future no estimate of additional funds required is submitted.

Recommended modifications of project. — None.

Neponset River.

On Jan. 4, 1916, the Directors entered into a contract with the Gerrish Dredging Company to excavate a basin in Neponset River near the head of navigation, opposite Godfrey's lumber wharf and near Vose's Grove, to a depth of 6 feet at mean low water, the contract price being 23.4 cents per cubic yard. Work was completed May 27, 1916, material to the amount of 36,013 cubic yards having been excavated at a cost of $7,790.56.

Operations by the Federal Government.

Dorchester Bay and Neponset River, Mass.

Condition at the end of fiscal year. — By dredging, a channel 175 feet wide and 18 feet deep at mean low water has been obtained up to Commercial Point and 100 feet wide and 15 feet deep at mean low water thence to Neponset Highway Bridge.

The approved project was completed December 28, 1909. The total expenditures were $94,584.55 for new work (which completed the project at a saving of $30,648.79) and $348.45 for maintenance, a total of $94,933.

Local cooperation. — The conditions imposed by the act of March 2, 1907, adopting the project, were that the portion of the river from Neponset Highway Bridge to Milton Mills should be dredged and maintained by the State of Massachusetts or other agency, to the depth of 6 feet at mean low water, 100 feet wide up to the Granite Bridge, 1.15 miles; 75 feet wide thence to Godfrey's Wharf, 1.25 miles; and thence 50 feet wide to the railroad bridge at Milton, a distance of 250 feet. These conditions were accepted by resolves of the Legislature of Massachusetts, approved June 24, 1907, and March 5, 1908, accepted by the Secretary of War February 10, 1908, and the work was completed in August, 1910, at a cost of $34,269.70. In 1914 the State widened to 280 feet, with a depth of 15 feet, the easterly side of the Government channel opposite the yacht basin of George Lawley & Sons, at a cost of $1,682.24.

Effect of improvement. — So far as can be ascertained, the improvement has resulted in no material reduction in freight rates, but is of advantage to shipping interests in permitting the utilization of larger vessels.

Proposed operations. — The funds available will be retained for incidental expenses in connection with maintenance of the channel. These are sufficient to meet any call likely to arise, and therefore no estimate of additional funds required is submitted.

Recommended modifications of project. — Under date of May 10, 1916 (see H. Doc. No. 1113, 64th Cong., 1st sess.), the Chief of Engineers reported that the further improvement by the United States of Dorchester Bay and Neponset River, Mass., up to Neponset Highway Bridge, is deemed advisable to the extent of widening the channel to 175 feet between Commercial Point and Neponset Highway Bridge, as indicated on the map accompanying the document, at an estimated cost of $36,225.

Weymouth Fore River.

The question of harbor lines in Weymouth Fore River was taken up by the Directors and a hearing held on Dec. 27, 1915. A plan and description of the proposed lines were prepared, and upon recommendation of the Directors the Legislature, by chapter 280 of the General Acts of 1916, established harbor lines extending on both sides of the river from the Quincy Point bridge southerly to Hayward's Creek.

On Jan. 13, 1916, complaint was received by the Directors from the Fore River Shipbuilding Corporation that in taking out the battleship "Nevada" they found that there were certain small shoals which had not been removed by the dredging operations of the previous year, and requested the Directors to have a portion of the channel dragged for the purpose of levelling down these shoals.

On Jan. 29, 1916, a contract was made with the Bay State Dredging and Contracting Company to do this dragging at a price of $13.75 per hour. Work commenced January 31, and was completed Feb. 5, 1916, at a cost of $660.

Operations by the Federal Government.

Existing project. — The existing project is to obtain, by dredging and removal of Channel Rock, a channel 24 feet deep at mean low water from that depth in Hingham Bay up to Weymouth Fore River Bridge at Quincy Point, a distance of about 3 miles, 300 feet wide, with a maximum width of 600 feet at the bend below Channel Rock, including the removal of a small shoal lying in the approach to the channel, south of the west end of Peddocks Island, at an estimated cost of $300,000 (Senate Com. Doc. No. 13, 63d Cong., 3d sess.). No estimate of cost of maintenance was stated. The project was adopted by the river and harbor act of July 27, 1916. A map

of the locality will be found in House Document No. 803, Sixty-third Congress, second session. The mean tidal variation is 9.5 feet.

Operations and results during the fiscal year. — By hired dredging plant two shoals immediately below the Weymouth Fore River bridge at Quincy Point were removed to the depth of 18 feet at mean low water, at an expenditure of $336.77, all for maintenance.

Condition at the end of fiscal year. — The net total of results accomplished under the previous and existing projects is a channel 18 feet deep at mean low water from that depth in Hingham Bay 300 feet wide up to the bridge at Quincy Point and a channel 6 feet deep at mean low water and 100 feet wide, narrowing to 50 feet, in the upper river. Maintenance of the latter channel since 1906 devolves upon the Commonwealth of Massachusetts. Under the existing project no work has been done and no expenditures made.

Local cooperation. — Under the project of March 3, 1905, the improvement of the river above the Quincy Point bridge was to be maintained by the Commonwealth of Massachusetts or other agency. This was provided for by a resolve of the legislature approved May 26, 1905, and accepted by the Secretary of War June 7, 1905. The Commonwealth has maintained the improvement at an expenditure of $21,042.98, and has also expended over $30,000 in dredging in the vicinity of Quincy Point Bridge and in local improvements in the lower part of the river. The act of July 27, 1916, adopting the project for the 24-foot channel, appropriated two-thirds ($200,000) of its total estimated cost, subject to the condition that local interests contribute the remaining one-third ($100,000). The Commonwealth of Massachusetts, by act approved April 22, 1915, provided $75,000 and the Fore River Shipbuilding Corporation has agreed to contribute $15,000. These funds will be made available as soon as the city of Quincy appropriates the $10,000 which it was authorized to do by an act of the Commonwealth of April 1, 1915. It is expected that the contributed funds will be received so that work may be commenced next spring.

Effect of improvement. — The increased depth obtained is of importance chiefly to the Fore River Shipbuilding Corporation, which builds at its extensive plant at Quincy Point large passenger and freight steamers, cruisers, and battleships up to 30,000 tons. No direct reduction in freight rates has been realized, but the improved channel has proven of value and benefit in permitting the entrance of larger barges loaded with coal and lumber and the passage of vessels of greater draft between the harbor and the shipyards on the river.

Proposed operations. — Of the $215,317.94 shown as available, $15-317.94 will be applied, should it become necessary, to removing shoals from the 18-foot channel, and the remaining $200,000 will be applied to the prosecution and completion of the existing project for the 24-foot channel when the $100,000 to be contributed by local interests becomes available.

Recommended modifications of project. — None.

Channels to Yacht Club Locations.

Orient Heights Yacht Club.

On Aug. 17, 1915, the Directors entered into a contract with J. P. O'Riorden to redredge to the depth of 6 feet at mean low water the channel and basin in front of the Orient Heights Yacht Club location. Work was completed Dec. 13, 1915, material to the amount of 14,634 cubic yards having been excavated at a cost of $2,798.75.

Pleasant Park Yacht Club.

On Aug. 26, 1915, the Directors entered into a contract with J. P. O'Riorden to dredge to a depth of not less than 6 feet at mean low water a channel and basin in front of the clubhouse of the Pleasant Park Yacht Club at Winthrop. Work was completed Dec. 8, 1915, material to the amount of 17,979 cubic yards having been excavated at a cost of $3,033.96.

Wollaston and Squantum Yacht Clubs.

On April 15, 1915, the Directors entered into a contract with the Morris & Cumings Dredging Company to dredge a channel in Quincy Bay 12 feet deep and 60 feet wide from deep water to the wharves of the Wollaston and Squantum Yacht Clubs. Work was completed June 9, 1916, material to the amount of 108,222 cubic yards having been dredged at a total cost of $12,986.64.

RIVERS, HARBORS, TIDEWATERS AND FORESHORES, EXCLUSIVE OF BOSTON HARBOR.

By chapter 481 of the Acts of the year 1909 the Board of Harbor and Land Commissioners was authorized and directed to undertake such work for the improvement, development, maintenance and protection of rivers, harbors, tidewaters and foreshores within the Commonwealth as it may deem to be reasonable and proper, and to expend during the years 1910, 1911 and 1912 a sum not exceeding $300,000, not more than $100,000 to be expended in any one year, provided, however, that an unexpended balance in any year may be used in the succeeding year.

This act also provided that the Board shall consider the general public advantage of the proposed work, the local interest therein as manifested by municipal or other contributions therefor, the importance of the industrial or commercial and other interests to be especially served thereby, and any other material considerations affecting the feasibility, necessity or advantage of the proposed work or the expenditure therefor. It was further provided that no work shall be commenced until after a public hearing has been held and a survey and estimate of cost have been made; that a city or town might appropriate money for the improvement of rivers, harbors, tidewaters and foreshores within its jurisdiction, the money so appropriated to be paid into the State treasury, to be expended by the Board for said purposes; and that the city or town might assume liability for all damages to property suffered by any person by any taking of land, or of any right, interest or easement in land within the city or town made by the Board for the purposes authorized by the act. By chapter 318 of the Special Acts of 1916 the Board was authorized to expend during the years 1916, 1917 and 1918 a sum not exceeding $750,000 for the purposes defined in the act of 1909 aforesaid, not more than $250,000 to be expended in any one year, except that an unexpended balance in any year may be used in the succeeding year for the said purposes.

Petitions under the act of 1909 aforesaid were filed with the Board during the period from Dec. 1, 1915, to Aug. 3, 1916, for

surveys and improvements in the following localities: Allens Harbor, Harwich; Bucks Creek, Chatham; Connecticut River, at Chicopee and Hadley; Cuttyhunk Harbor; Duxbury Harbor; East Bay, Osterville; Herring River, Harwich; Hyannisport, Barnstable; Lake Anthony, Oak Bluffs; Little Harbor, Marblehead; Lynn Harbor; Mitchell's River, Chatham; North River, Salem; Oak Bluffs; Plymouth Harbor; Red Brook Harbor, Bourne; Rockport Harbor; Sandwich Harbor; Scituate; Warrens Cove, Plymouth; Witchmere Harbor, Harwich.

Petitions under this act have been filed with the Commission on Waterways and Public Lands, between Aug. 3, 1916, and Nov. 30, 1916, for surveys and improvements in the following localities: Falmouth Heights, Falmouth; Yarmouthport Harbor.

Apponagansett River.

On May 26, 1916, further hearing was held on petitions for improvement of this river. On June 28, 1916, the Board entered into a contract with John R. Burke for dredging. The contract prices are: for dredging, 38.5 cents per cubic yard measured in scows; $10 per cubic yard for excavating bowlders.

The Commission reports that work was completed Sept. 28, 1916, and comprised the dredging to a depth of 6 feet at mean low water of an additional area of about 72,000 square feet to the basin dredged by the Commonwealth in 1914, the cost of this work being $4,654.65.

Amount expended during the year, $4,943.42.

Total expenditure to Dec. 1, 1916, $55,092.18.

Barnstable Harbor.

By chapter 342 of the Special Acts of 1915 the Board was authorized to make an examination and dredge a channel and anchorage basin in Barnstable Harbor from deep water in said harbor to and into that part of said harbor known as Maraspin

Creek, in such locations and to such depths as it may deem necessary and advisable.

Under date of Aug. 4, 1915, the Board entered into a contract with John H. Gerrish to dredge a channel and basin, the channel to extend from the 6-foot contour in the harbor southwesterly about 1,500 feet to Maraspin Creek, thence southerly in the creek about 550 feet to the basin, the width to be 50 feet on the bottom and 6 feet deep at mean low water, and the basin to be about 150 feet wide and 300 feet long on the bottom, and 6 feet deep at mean low water.

Work under the terms of this contract should have been completed Feb. 1, 1916. Practically no work had been done up to that date, and the contract was accordingly terminated. On April 11, 1916, a new contract at the same contract prices was entered into with the Gerrish Dredging Company for work in this harbor. This work is in progress.

Amount expended during the year, $7,359.63.

Total expenditure to Dec. 1, 1916, $7,633.74.

Bass River, Yarmouth.

The Board entered into a contract on April 15, 1915, with the Eastern Dredging Company to dredge a channel from the 6-foot contour in Nantucket Sound, about 2,100 feet south of the end of the jetties, to the 6-foot contour in the anchorage basin, a total distance of about 3,650 feet, the channel to be 6 feet deep at mean low water and 60 feet wide on the bottom, increasing to 125 feet at the upper end.

The completion of work under this contract was delayed by the bankruptcy proceedings of the Eastern Dredging Company. With the consent of the Board, work under this contract was sublet to John R. Burke, and was completed July 31, 1916, at a cost of $14,967.96.

Amount expended during the year, $6,676.27.

Total expenditure to Dec. 1, 1916, $70,173.95.

Beverly Harbor.

No work has been done by the Commonwealth in this harbor during the year.

Operations by the Federal Government.

Condition at the end of fiscal year. — The net total of results accomplished under the previous and existing projects is a channel 18 feet deep at mean low water and not less than 250 feet wide for a distance of about 3,200 feet from Bar Beacon to Lobster Rocks Beacon, with an increase of about 100 feet in width on the northerly side about opposite Rams Horn Beacon, and not less than 200 feet wide from Lobster Rocks Beacon to the lower end of the draw pier at the highway bridge.

Local cooperation. — None.

Effect of improvement. — The improvement to 18-foot depth is reported to have effected a reduction in freight rates of 25 cents per ton on bituminous coal.

Proposed operations. — No funds are available; but as no work in maintenance of the improved channel is necessary, no estimate of additional funds required is submitted.

Recommended modifications of project. — In House Document No. 220, Sixty-third Congress, first session, the Chief of Engineers reported that the improvement by the United States of Beverly Harbor, Mass., with a view to securing a channel 24 feet deep and 200 feet wide at an estimated cost of $173,000, is deemed advisable, with certain provisos as to cooperation.

BRANT ROCK, MARSHFIELD.

The Board entered into a contract on Oct. 27, 1915, with Dennis F. Crowley to repair the sea wall north and south of Brant Rock, including the construction of a sub-base under portions of the face of foundation of the wall, the filling of holes in the wall, and the pointing of the joints in such places as should be directed.

Work was completed Jan. 15, 1916, at a cost of $949.24.

Amount expended during the year, $962.24.

Total expenditure to Dec. 1, 1916, $965.84.

BUCKS CREEK, CHATHAM.

On March 4, 1916, a petition of the selectmen of Chatham, under chapter 481 of the Acts of 1909, for extension of jetty and for dredging at Bucks Creek, was received by the Board. Hearing was held March 21, 1916.

The Commission reports that on Aug. 1, 1916, proposals for this work were received, and a contract subsequently awarded

to W. S. Rendle. The contractor later requested to be released, and the work was not undertaken.

Amount expended during the year, $52.45.

Total expenditure to Dec. 1, 1916, $14,342.03.

Cohasset Harbor.

The Commission reports that it caused an examination and survey to be made of the breakwater built by the Commonwealth in 1911 at Bassing Beach, Cohasset, to determine its effect upon the erosion of the beach in front of certain property in Cohasset. The results of this examination indicate that there may be a necessity for the building of certain structures at or near the inshore end of this breakwater. This matter will be taken up for consideration by the Commission in connection with the allotments for river and harbor improvement during the coming year.

Amount expended during the year, $62.93.

Total expenditure to Dec. 1, 1916, $54,326.10.

Concord River.

By chapter 92 of the Resolves of 1915 the Board was authorized to improve that part of Concord River within the town of Billerica by removing rocks and other obstructions.

The Board entered into a contract on Sept. 21, 1915, with the Cape Ann Granite Corporation to remove bowlders and ledges for the purpose of clearing a channel in this river between Fordway bridge and Corner bridge, removal to be made within the area shown on the plan accompanying the contract to a depth of 3 feet below the crest of the dam at North Billerica.

Work was completed Dec. 27, 1915, at a cost of $1,477.50.

Amount expended during the year, $1,495.88.

Total expenditure to Dec. 1, 1916, $1,664.59.

Connecticut River.

By chapter 344 of the Acts of 1885 the Board was given jurisdiction over the Connecticut River and its banks.

Protective works were commenced on the river banks under authority of chapter 95 of the Acts of 1888, and have been

carried out in various localities, the method adopted having been explained in detail in reports of the Board. The Commission in October, 1916, made an inspection of various portions of the river bank where protective work has been completed and where work was in progress.

Chicopee.

After a hearing by the Board on May 26, 1916, on petition of the mayor of Chicopee and others, under chapter 481 of the Acts of 1909, for the extension of protective work on the east bank of the Connecticut River, Chicopee, plans and estimates were prepared and proposals received.

The Commission reports that on Aug. 18, 1916, it entered into a contract with Dennis F. Crowley for the construction of about 500 linear feet of concrete retaining wall, with stone rip-rap in front of the same, on the east bank of the Connecticut River in Chicopee. The contract prices are: for furnishing materials and building the concrete retaining wall, $10.30 for each cubic yard of concrete measured in place in the completed work; for furnishing stone and placing it against the face of the retaining wall, $3 for each ton of 2,000 pounds. Up to Dec. 1, 1916, this work had not been completed.

Amount expended during the year, $2,024.99.

Total expenditure to Dec. 1, 1916, $17,909.95.

Hadley.

On May 25, 1916, a petition of Cornelius Callahan, under chapter 481 of the Acts of 1909, for protection of the eastern bank of the Connecticut River in the town of Hadley, was presented. The Board held a hearing on this petition on May 26, 1916.

The Commission in September, 1916, considered a report of its engineer in relation to this matter, but has taken no further action.

Amount expended during the year, $103.04.

Total expenditure to Dec. 1, 1916, $86,365.37.

Hatfield.

A contract was entered into by the Board on May 12, 1915, with Daniel O'Connell's Sons for furnishing and placing in position about 1,350 tons of rip-rap in two places on the bank of the river, the portions of the bank to be protected extending down river from the south side of the roadway at the Hatfield Ferry about 750 feet, and opposite the north end of the dike about 250 feet.

The Commission reports that work was completed Sept. 28, 1916, at a cost of $2,498.24.

Amount expended during the year, $2,706.40.

Total expenditure to Dec. 1, 1916, $14,952.57.

Operations by the Federal Government.

Connecticut River above Hartford, Conn.

Proposed operations. — The river and harbor act approved July 27, 1916, provided that so much of the appropriation of July 25, 1912, as may be necessary may, in the discretion of the Chief of Engineers, be expended for maintenance dredging in the river above Hartford. It is proposed to apply so much of the available funds as may be necessary to the removal of some obstructive shoals in the river in the vicinity of Springfield. These shoals, while of artificial origin, have been there so long that it is impracticable to identify the parties responsible for their creation. It is proposed to do this work during the fiscal year ending June 30, 1917. It is estimated that this work will cost not over $1,200. No other operations are proposed during the coming fiscal year.

Recommended modifications of project. — Under date of November 12, 1915, the Chief of Engineers recommended, subject to certain conditions, providing a channel 12 feet deep and 100 feet wide from Hartford to Holyoke, at a cost of $1,870,000 for new work and $65,000 annually for maintenance. (H. Doc. No. 417, 64th Cong., 1st sess.)

COTUIT HARBOR.

A survey was made in June, 1916, and proposals for dredging in Cotuit Harbor received by the Board on Aug. 1, 1916, but were rejected on Aug. 2, 1916, as excessive in price.

The Commission has taken no action in this matter.

Amount expended during the year, $356.68.

Total expenditure to Dec. 1, 1916, $30,800.42.

Cuttyhunk Harbor.

A petition of the selectmen of the town of Gosnold, under chapter 481 of the Acts of 1909, for enlarging the basin in Cuttyhunk Harbor, was presented on March 28, 1916. A contract was entered into by the Board on June 28, 1916, with the J. S. Packard Dredging Company, for widening to a depth of 8 feet at mean low water the basin in this harbor. The contract prices were: for dredging and disposing of the dredged material, 29.97 cents per cubic yard measured in scows; for excavating bowlders, $7 per cubic yard.

The Commission reports that work was completed Sept. 11, 1916, at a cost of $8,991.60.

Amount expended during the year, $9,281.57.

Total expenditure to Dec. 1, 1916, $70,754.18.

Duxbury Harbor.

A petition of Alfred E. Greene and others, under chapter 481 of the Acts of 1909, for further dredging in Duxbury Harbor, was presented May 16, 1916. On June 28, 1916, the Board entered into a contract with the Bay State Dredging and Contracting Company for dredging to a depth of 6 feet at mean low water an extension to the basin, and the removal of shoals in the channel in Duxbury Bay. The contract prices were: for dredging and disposing of the dredged material, 36 cents per cubic yard measured in scows; for excavating bowlders, $12 per cubic yard.

The Commission reports that work was completed Nov. 15, 1916, at a cost of $8,234.64.

Amount expended during the year, $7,297.39.

Total expenditure to Dec. 1, 1916, $26,551.59.

East Bay, Osterville.

A petition of Chester Bearse and others, under chapter 481 of the Acts of 1909, for dredging the channel in East Bay, Osterville, was received by the Board May 22, 1916. A survey

was made in June, 1916, and proposals for this work received on Aug. 1, 1916, but were rejected on Aug. 2, 1916, as excessive in price.

The Commission has taken no action in this matter.
Amount expended during the year, $192.25.
Total expenditure to Dec. 1, 1916, $23,529.79.

Fall River Harbor.

State Pier.

A detailed statement as to the needs of the harbor of Fall River, together with statistical information and an account of the work undertaken by the Federal government, and the appropriations and expenditures therefor, was made in the report of the Board for the year 1913.

On July 2, 1914, chapter 732 of the Acts of 1914, relative to the development of the port of Fall River, was approved, providing for the appointment of a special board to select a site for a public wharf, to secure options on land, and to make plans and a detailed estimate of the cost of procuring the land and of constructing said wharf. A report signed by a majority of the members of this special board, and a dissenting report, were filed with the Legislature in the early part of 1915. (See House Document No. 1800 of 1915.)

By chapter 279 of the General Acts of 1915 the Board of Harbor and Land Commissioners, for the purpose of improving and developing this harbor and the transportation and terminal facilities of the city of Fall River, was authorized to construct piers and to do other work to provide for handling freight and receiving passengers, to select a suitable location for the wharf and piers authorized by the act, and authorized to expend on behalf of the Commonwealth, for the purposes of the act, a sum not exceeding $350,000. Upon the completion of the work authorized the Board is to administer the terminal facilities acquired or created by the Commonwealth under the provisions of the act, the expenses thereof to be determined by the Governor and Council and paid by the Commonwealth, the Board to make rules and regulations and charge such reasonable rates

for the use of the structures and equipment as shall be approved by the Governor and Council. The city of Fall River is authorized to take or acquire by purchase or otherwise piers, wharves, buildings, land, flats, rights, privileges, easements and such other land abutting on Mount Hope Bay as the city may deem advisable, and to transfer the same, or such part thereof as the Board may deem necessary, to the Commonwealth without payment therefor, the land so transferred to the Commonwealth to be for the purpose of carrying into effect the provisions of the act. The city, for the purpose of paying the necessary expenses of acquiring land and other property, and for making any contribution necessary toward the work to be done by the Board, is authorized to issue from time to time bonds or notes to an amount not exceeding $250,000. Any unexpended balance of the $250,000 received from the issue of bonds or notes by the city remaining after the payment for land and other property necessary for the site shall be available for the construction of the pier if deemed necessary by the Board, and may be used by it in addition to the $350,000 which the Board is authorized to expend.

In addition to various conferences with officials of the city of Fall River and other parties, the Board held a public hearing at the City Hall in Fall River on June 14, 1915, and learned the views of various parties as to the most desirable location for the construction of a pier. In July, 1915, the Board made personal inspection of the entire water front of the city.

Various sketch plans, studies and estimates of cost for building a pier and other necessary structures and connections at several localities along the water front were prepared by the chief engineer of the Board, but up to Dec. 1, 1915, no conclusive action had been taken with respect to the selection of a site.

After further conferences with the mayor and city officials of Fall River, and the consideration of a report submitted by an engineer employed by the mayor, the Board on June 20, 1916, passed the following vote: —

Voted, That the Board of Harbor and Land Commissioners, acting under the provisions of chapter 279 of the General Acts of the Legislature of Massachusetts, approved May 27, 1915, selects and determines that

the location for the wharf and piers authorized to be built in Fall River Harbor shall be within the area shown on the accompanying plan entitled "Plan showing Location selected by the Board of Harbor and Land Commissioners for the Wharf and Piers to be built in Fall River Harbor under Authority of Chapter 279 of the General Acts of 1915. June 1916. Scale 1:500 William F. Williams Chief Engineer", and bounded and described as follows:

Beginning at a point marked A on said plan, in the intersection of the southerly line of Ferry Street and the westerly line of Almond Street, in the city of Fall River, and running in a general westerly direction in a curved line of 141 feet radius 100.11 feet to a point marked B; thence running westerly more southerly in a line drawn parallel with and 425.27 feet southeasterly from the harbor line approved by the Secretary of War January 12, 1900, 38 feet, more or less, to a point marked C in the mean high water line; thence running in a general southwesterly direction in the mean high water line to a point marked D 955 feet southwesterly from a point marked A′ on said plan in the intersection of the mean high water line and the southerly line of Ferry Street; thence running northeasterly 831 feet, more or less, to a point marked E in said harbor line; thence running northeasterly more easterly in said harbor line 428 feet to a point marked F; thence running southerly 318 feet, more or less, to a point marked G at a corner of the existing wall; thence running southwesterly in the existing wall 40 feet, more or less, to a corner of said existing wall marked H; thence running southeasterly in said existing wall 48 feet, more or less, to said point A′ in the southerly line of Ferry Street; thence running southeasterly in said southerly line of Ferry Street 124 feet, more or less, to A, the point of beginning.

Voted, That the city of Fall River be requested to take such action in accordance with the provisions of chapter 279 of the General Acts of the Legislature of Massachusetts, approved May 27, 1915, as may be necessary for the acquisition by said city by purchase or otherwise of upland and flats within the area A–B–C–I–H–A′–A shown on said plan and marked "Area to be acquired by the City of Fall River", and to transfer to the Commonwealth of Massachusetts without cost all the right, title and interest of the city so acquired in and to said upland and flats and in and to any other land, flats, piers and buildings included within the territory to be improved and developed by the Commonwealth under authority of chapter 279 aforesaid.

Voted, That an attested copy of the foregoing votes and a copy of the plan accompanying the same be forwarded to the mayor of the city of Fall River.

In connection with this improvement the Board granted on Aug. 1, 1916, a license to the Old Colony Railroad Company to fill solid in Fall River Harbor adjoining its Globe freight yard

in the city of Fall River. The work to be done under this license will enable the railroad company to lay railroad tracks and make the necessary railway connections with the proposed pier.

The Commission has held conferences with the mayor and other officials of the city of Fall River but has done nothing further. Negotiations are pending by the city of Fall River for raising the necessary money to purchase the land for the site of the pier and to turn over to the State the property so acquired.

Amount expended during the year, $68.41.

Total expenditure to Dec. 1, 1916, $854.10.

Operations by the Federal Government.

Operations and results during the fiscal year. — The operations consisted of maintenance dredging in the approach channel and along the east side of the harbor between the Old Colony Steamboat Co.'s wharf and Slades Ferry Bridge. This work was done by the Government-owned dredge *Gedney* and hired labor at a total cost of $13,478.66, all of which was for maintenance.

Condition at the end of fiscal year. — At the end of the fiscal year the general project was completed. The maximum depth over the shoalest part of the locality under improvement is about 25 feet at mean low water. The total expenditure under the existing project was for new work, $300,222.51, and for maintenance, $49,054.17, a total of $349,276.68.

Local cooperation. — None.

Effect of improvement. — The increased depth in the approach channel and in the harbor permits the entrance of larger vessels and facilitates the handling of the large steamers of the Fall River Line to New York, but, so far as known, the improvement has had no effect on freight rates.

Proposed operations. — No estimate is submitted for the reason that the project is completed and no further work is proposed at this time.

FALMOUTH HEIGHTS.

On Oct. 6, 1916, a petition of the selectmen of Falmouth and others, under chapter 481 of the Acts of 1909, for an extension of the sea wall built by the Commonwealth at Falmouth Heights, was presented to the Commission. No further action has been taken on this petition.

Total expenditure to Dec. 1, 1916, $5,625.22.

Gloucester Harbor.

An account of the various surveys, projects and expenditures by the Federal government pertaining to Gloucester Harbor, as well as surveys made and harbor lines established therein by the Commonwealth, was set forth in the reports of the Board for 1913, 1914 and 1915.

The Commission reports that on Aug. 9, 1916, it received proposals for dredging in Gloucester Harbor near Five Pound Island, and on Aug. 18, 1916, entered into a contract with the Boston Dredging Company for dredging an extension of the channel north of Five Pound Island, and the removal of bowlders and ledge. The contract prices were: for dredging the channel and disposing of the dredged material, 47½ cents for each cubic yard of material measured in scows; for excavating bowlders in excess of 1 cubic yard and not greater than 5 cubic yards, and disposing of the same, $9.50 for each cubic yard; for excavating bowlders over 5 cubic yards in volume and ledge and disposing of the same, $15 for each cubic yard. Work was completed Nov. 29, 1916, at a cost of $9,057.23.

Amount expended during the year, $11,288.81.

Total expenditure to Dec. 1, 1916, $23,305.77.

Operations by the Federal Government.

Operations and results during the fiscal year. — Under contract, work on removal of the two remaining ledges in the outer harbor was in progress. The expenditures were $493.96 for new work.

Effect of improvement. — Freight rates are probably not affected, as the principal industry is fishing, but the work done has resulted in greatly increased facilities for navigation.

Proposed operations. — Of the funds available, $3,300 is applicable to the breakwater project when needed. The balance, $17,104.76, is for the ledge removal, which it is expected will be completed before the close of the present working season. No estimate of additional funds required is therefore submitted.

Gun Rock Point, Hull.

On June 28, 1916, the Board received proposals for the construction of a breakwater off Gun Rock Point in the town of Hull, and on July 5, 1916, entered into a contract with the

Rockport Granite Company for building a stone breakwater in this locality. The contract price for furnishing stone and depositing it in place in the breakwater was $1.55 per ton of 2,000 pounds.

At the time of the awarding of the contract a contribution of $5,000 toward the cost of the work was expected from the town of Hull. At a town meeting held July 11, 1916, the voters of Hull passed a vote authorizing the issuance of notes for this amount and the payment of the money to the Board to be expended for this work. Certain legal difficulties prevented the raising of this money by the town in the manner contemplated by the vote of the town meeting. Under these circumstances the cost of the work under the contract was limited to $25,000 instead of $30,000, as originally intended.

The Commission reports that work was completed Nov. 29, 1916. A stone breakwater has been built, beginning about 100 feet north of Gun Rock Point and extending in a slightly northwesterly direction toward Boston Light, a distance of about 200 feet. The top of the breakwater is at elevation 13.5 feet above mean low water and is about 15 feet wide. Back of the breakwater the depth of water is about 15 feet at mean low water. The cost of the work was $24,510.15.

Amount expended during the year, $14,345.53, which is the total expenditure to Dec. 1, 1916.

Herring River, Harwich.

A petition of the selectmen of Harwich, under chapter 481 of the Acts of 1909, for certain dredging in Herring River, was received by the Board March 4, 1916, and a hearing held May 26, 1916. On Aug. 1, 1916, proposals were received. These proposals were rejected on Aug. 2, 1916, as excessive in price and no further action taken.

The Commission reports that during August, 1916, letters were received from various property owners at West Harwich complaining of the condition of the timber fence built by the Commonwealth at the mouth of this river and consequent

damage to property. On Sept. 26, 1916, a contract was entered into with Messrs. Nickerson and Freeman for replanking an old timber bulkhead, and the construction of three pile and plank spur jetties in front of the same, on the shore east of the entrance to this river. The contract price was the lump sum of $696, and the work has been completed. The sum of $816.75 was expended during the year in connection with structures built under the direction of the Commission at this river, of which $714 was paid from the appropriation of $2,000 made by chapter 79 of the Special Acts of 1916 for surveys of harbors and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth, and $102.75 from the appropriation for improvement of rivers and harbors. Total expenditure to Dec. 1, 1916, $35,110.42.

Hyannis Harbor.

No work has been done by the Commonwealth in this harbor during the year.

Operations by the Federal Government.

Effect of improvement. — So far as known, the improvement has had no effect on freight rates, but the harbor provides shelter for a greater number and a larger class of vessels.

Proposed operations. — Project is completed. No new work is contemplated at this time. The harbor is in fair condition and continues to offer a good refuge from southerly storms for the lighter draft vessels using these waters, for which it was designed, while the modern tendency is toward the building of vessels of greater draft and larger carrying capacity than would find this harbor useful. No estimate for maintenance is submitted, as the project is completed, and this is a final report.

Hyannisport.

On May 23, 1916, a petition of T. F. Phinney and others, under chapter 481 of the Acts of 1909, for the extension of the breakwater at Hyannisport and the removal of rocks in the harbor, was presented. After hearing on May 26, 1916, and examination and survey, proposals for the work were received on June 14, 1916. On this same date the Board entered into a contract with the Bay State Dredging and Contracting Company for the addition of a new course of capstones to the pres-

ent breakwater, the extension of the same and the removal of rocks in the harbor. The contract prices for this work were: for furnishing the capstones in place, including the resetting of present capstone where necessary, $5 per ton; for furnishing stones and depositing them in place in the extension of the breakwater, $2.80 per ton; for furnishing and setting in place iron clamps and pins, 35 cents per pound for iron in place; for removing rocks, $6 per ton.

The Commission reports that work was completed Oct. 12, 1916, at a cost of $27,682.15.

Amount expended during the year, $27,010.25.

Total expenditure to Dec. 1, 1916, $51,336.50.

Ipswich River.

On Aug. 10, 1915, a contract was entered into with John H. Gerrish to dredge a channel through three shoal places to a depth of 6 feet at mean low water, the bottom width of the sections to be dredged varying from 60 to 75 feet, and the length of the same varying from 550 to 1,450 feet. The amount of material to be removed, including the required slopes, was estimated to be about 33,235 cubic yards, scow measurement. The contract prices were: for dredging the channel and disposing of the dredged material, including bowlders 1 cubic yard or less in volume, 31.7 cents for each cubic yard of material excavated, measured in scows; for excavating bowlders in excess of 1 cubic yard and not greater than 5 cubic yards in volume, and disposing of the same, $6 for each cubic yard.

Under the terms of the above contract work was to be completed Jan. 1, 1916. As only a small amount had been done at that time, the contract was terminated in February, 1916, and in April, 1916, a new contract entered into with the Gerrish Dredging Company.

The Commission reports that this work was completed Oct. 21, 1916, at a cost of $26,433.80.

Amount expended during the year, $26,081.96.

Total expenditure to Dec. 1, 1916, $44,790.82.

Lake Anthony.

On June 7, 1916, a petition of the selectmen of Oak Bluffs, under chapter 481 of the Acts of 1909, for further dredging in Lake Anthony, was presented to the Board. Proposals were received Aug. 1, 1916, but were rejected Aug. 2, 1916, as excessive in price.

The Commission has taken no action in this matter.

Amount expended during the year, $23.57.

Total expenditure to Dec. 1, 1916, $46,414.43.

Lewis Bay.

By chapter 356 of the Special Acts of 1915 the Board was authorized to make an examination and survey and to dredge a channel or channels and anchorage basin in Lewis Bay, in Barnstable and Yarmouth, in such places and to such depths as it may deem necessary.

On Sept. 22, 1915, a contract was entered into with John R. Burke to dredge the outer and inner channels and a basin, the outer channel to be 60 feet wide on the bottom, 9 feet deep at mean low water and about 4,700 feet long, the inner channel to be 60 feet wide on the bottom, 6 feet deep at mean low water and about 300 feet long, and the basin to be 200 feet wide and 250 feet long on the bottom and about 6 feet deep at mean low water. The amount of material to be removed, including the required slopes, was estimated to be about 36,000 cubic yards, scow measurement. The contract prices were: for dredging the channels and basin and disposing of the dredged material, including bowlders 1 cubic yard or less in volume, 23.4 cents for each cubic yard of material, measured in scows; for excavating bowlders in excess of 1 cubic yard and not greater than 5 cubic yards in volume, and disposing of the same, $10 for each cubic yard.

Work was completed June 24, 1916, at a cost of $9,861.95.

Amount expended during the year, $11,298.30.

Total expenditure to Dec. 1, 1916, $28,959.21.

LYNN HARBOR.

By chapter 291 of the General Acts of 1915, the Board was authorized to enlarge the anchorage basin, dredged under a contract made in 1913, and to deposit the dredged material on certain land and flats in this harbor belonging to the Commonwealth and under the control of the Metropolitan Park Commission and within a bulkhead then built or within an extension thereof. Authority was given to expend for dredging and depositing the dredged material a sum not exceeding $25,000 from the treasury of the Commonwealth, provided that there is available an additional sum of $5,000 to be appropriated by the city of Lynn, and that of the amount to be paid from the treasury of the Commonwealth $15,000 shall be paid from the ordinary revenue and the remaining $10,000 paid from the Metropolitan Park Commission's maintenance fund.

On July 21, 1915, a contract was entered into with the J. S. Packard Dredging Company to enlarge this basin and to deposit the dredged material as required by the above act, dredging to be done to a depth of 6 feet at mean low water over an area of about 445,000 square feet, and the dredged material to be deposited to an elevation of 15 feet above mean low water. The amount of material to be removed from the anchorage basin, including the required slopes, was estimated to be about 117,000 cubic yards, *situ* or scow measurement. The contract price was: for dredging the basin and disposing of the dredged material, including bowlders 1 cubic yard or less in volume, within the bulkhead built by the Metropolitan Park Commission on the Nahant shore, or against the outer face of said bulkhead, or in the earth dike or other structure to be built at the northerly end of the area to be filled, including the construction of a sod dike or timber structure, the rehandling of the material from scows, grading and all incidental work, the sum of $30,000. Work under the above contract was completed May 8, 1916, at a cost of $30,000.

Amount expended during the year, $25,611.53.

Total expenditure to Dec. 1, 1916, $62,700.45.

Operations by the Federal Government.

Effect of improvement. — The deepening of the channel to 15 feet enables the smaller barges to carry full cargoes of coal to the wharves at all stages of the tide and barges of the greatest draft during the higher stages. It is reported by local commercial interests that the cost of transportation was reduced 25 cents a ton by deepening the channel to 10 feet and further diminished by increasing the depth to 15 feet.

Proposed operations. — It is proposed to apply so much as may be necessary of the funds available to removal of shoals which now contract the width of the inner channel and basin. The work will be commenced in the fall of 1916, and will require about two months for its completion. The funds now available are more than sufficient to complete this work, and the balance will be held to provide for future maintenance.

Recommended modifications of project. — None.

A report on the preliminary examination of Lynn Harbor, dated Nov. 20, 1915, is printed in House Document No. 1358, 64th Congress, First Session. The improvement of the locality is not deemed advisable at the present time to a greater extent than is now authorized by the existing project.

Lynn Harbor and Saugus River.

By chapter 741 of the Acts of 1914 the Board was authorized to improve Lynn Harbor and Saugus River by dredging a channel not less than 12 feet in depth at mean low water from the present 12-foot contour southerly of the Point of Pines to the Boston & Maine railroad bridge across Saugus River, and by dredging said river between the Boston & Maine railroad bridge and Fox Hill bridge, so called. Said Board was authorized to expend for dredging a sum not exceeding $50,000, provided that no part of this sum should be available or expended until evidence was presented to the Auditor of the Commonwealth that there was available the additional sum of $30,000, of which one-half should be appropriated by the city of Lynn for the building of bulkheads and the reclamation of flats owned by said city bordering on said river, and the balance, $15,000, for dredging said river between the Boston & Maine railroad bridge and Fox Hill bridge and for reclamation of certain flats, to be contributed by other parties. A further provision of the act was that the city should be allowed to use the material dredged under authority of the act for the purpose of reclaiming certain flats.

On Oct. 6, 1914, a contract was entered into with the Eastern Dredging Company, involving an expenditure of not exceeding $95,000, the $15,000 in excess of the amount provided for in the act of 1914 aforesaid being made up by an allotment of $10,000 from the funds at the disposal of said Board under authority of chapter 481 of the Acts of 1909, and an additional appropriation of $5,000 by the city of Lynn. A description of the work covered by this contract, including the contract prices, is set forth in the report of said Board for 1914.

Work was commenced in Oct. 1914, and completed, so far as funds admitted, on July 22, 1916. During this time the Eastern Dredging Company went into bankruptcy, and, with the consent of the Board, the remaining work was sublet to the Maryland Dredging and Contracting Company and carried out by said company. The consequent increased cost of supervision, due to the longer time taken for the performance of the work and certain unforeseen increases in the amount of material to be removed, made it impossible to complete all the dredging called for by the contract without exceeding the limit of cost stated in the contract, $95,000.

The outer end of the channel is, therefore, incomplete as to width and depth for a distance of about 2,800 feet, and will require for completion as originally contemplated the removal of from 30,000 to 50,000 cubic yards of material.

On Sept. 28, 1916, the Commission received proposals for the completion of this dredging. The lowest bidder refused later to enter into a contract at the prices named in his proposal, nor has the Commission been able as yet to secure from any contractor a reasonable price for the work. No further action has been taken.

Amount expended during the year, $33,999.02.

Total expenditure to Dec. 1, 1916, $94,953.11.

Merrimack River.

The report of the Board for the year 1913 contained an account of the surveys and projects of the Federal government for the improvement of Merrimack River, of a survey and study of

the possibilities of development of navigation and power, and the conclusions and recommendations of the Merrimac Valley Waterway Board, a special commission appointed under the provisions of chapter 708 of the Acts of 1912 to make an investigation of this river.

This was followed by the passage of chapter 691 of the Acts of 1914, which authorizes the expenditure, under the direction of the Harbor and Land Commissioners, of not exceeding $1,000,000 for the improvement for navigation of this river, from the sea to Lowell, by the construction of a channel therein, "*provided*, that no part of said sum shall be available or expended until the congress of the United States shall approve a project, and make an appropriation therefor, to improve that part of said river from the sea to a point opposite Ward's hill about one mile above Haverhill, so that a continuous channel will be provided throughout this part of said river not less than eighteen feet deep at mean low water and of adequate width."

In November, 1914, a report of the United States engineer officer stationed at Boston, on his survey of this river with a view to securing increased depth from Lowell to the sea or in any part of this section of the river, together with estimate of cost, was submitted to the Chief of Engineers.

This report was unfavorable to the undertaking of the improvements by the Federal government because of the large cost involved and the uncertainty of resultant benefits commensurate with so large an expenditure; also because of the possible effect upon the improvement of the river at the mouth by the restriction of tidal scour if a dam should be built, and the possible disadvantages arising from the consequent ponding of water containing sewage.

At the request of persons interested in this matter the report was referred back to the district engineer officer, in order that opportunity might be given for the submitting of further evidence in regard to the necessity for this improvement and its economic value.

In response to a request from the Board a statement was received from Col. William E. Craighill, Corps of Engineers, U. S. A., in part as follows: —

My report of Nov. 10, 1914, upon the survey of Merrimac River, was returned to me by the Chief of Engineers on Dec. 14, 1914, with the statement that it had been represented to the Chief of Engineers that parties interested in the improvement of Merrimac River had substantial additional facts tending to prove the advisability of improving the river. I was instructed to give such time as they might desire to submit additional data, provided that the resubmission of the report should be delayed not later than Nov. 1, 1915. Pursuant to those instructions, a public hearing was held at the City Hall, Lawrence, April 15, 1915, and subsequently various conferences were held at this office with persons interested in the improvement.

After careful consideration I submitted final report upon the matter under date of Oct. 22, 1915, my conclusions being that the benefits to be expected are so uncertain, and the physical difficulties, and consequently the cost, are so great that the improvement should not be undertaken by the United States.

By chapter 50 of the Resolves of 1916 it was provided that the sum of $1,000,000, appropriated by chapter 691 of the Acts of 1914, should be available for the purpose, and subject to the conditions specified in that act, for a period of three years from the passage of this resolve.

Amount expended during the year, $7.21.

Total expenditure to Dec. 1, 1916, $569.26.

The River and Harbor Act, approved March 4, 1915, authorizes and directs the Secretary of War to cause a preliminary examination and survey to be made of Merrimac River from Lowell, Mass., to Manchester, N. H. Up to Dec. 1, 1916, a copy of the preliminary report was not available.

Operations by the Federal Government.

Condition at the end of fiscal year. — The net total of results accomplished under the previous and existing projects is a channel of a least depth of 7 feet at mean low water and least width of 150 feet from the mouth of the river to Haverhill. About 9 feet draft can be carried at mean low water to Newburyport, and about 12 feet in the natural channel from Newburyport to Amesbury.

Local cooperation. — None.

Effect of improvement. — The improvement of the channel is reported to enable the delivery of coal by water at rates 35 to 50 cents per ton less than by rail.

Proposed operations. — The restoration of the channel to its full projected dimensions was completed in August, 1914. From past records

it may be expected that maintenance dredging may soon be required; and the $10,000 appropriated by the river and harbor act of July 27, 1916, will be sufficient to last until at least June 30, 1918.

Mitchell's River, Chatham.

The Board held hearings on March 21 and May 26, 1916, on the petition of George E. Perry and others, under chapter 481 of the Acts of 1909, for dredging the channel in Mitchell's River, Chatham.

On Sept. 18, 1916, the Commission considered a report of its engineer on survey and estimate of cost of this improvement, and made on Sept. 23, 1916, an inspection of the locality. No further action has been taken during the year.

Amount expended during the year, $322.96, which is the total expenditure to Dec. 1, 1916.

New Bedford and Fairhaven Harbors.

State Pier.

The Board of Harbor and Land Commissioners reported in 1915 that by chapter 693 of the Acts of 1914 the Board was authorized to reconstruct and extend the present southerly pier owned by the city of New Bedford and to reconstruct the pier adjoining the same on the north; to build sheds or other buildings on said piers, and to provide the necessary equipment and appliances for handling freight and receiving passengers; to also fill solid and dredge and to do such other work as might be necessary to carry out the purposes of the act for the improvement of the harbor and terminal facilities of the city of New Bedford.

A new harbor line having been established in this locality by chapter 378 of the Acts of 1914, plans were prepared by the chief engineer of the Board and its regular engineering force for the construction, within the appropriation of $350,000, of a single pier which, with the berth on each side, will occupy the space now covered by the two piers referred to in the act.

Proposals were invited for the construction of the pier and shed, on both a solid-fill and open-pier type of design, and

under date of Jan. 5, 1915, a contract was entered into with the W. H. Ellis & Son Company to carry into effect the work called for in the plans and specifications, involving an expenditure of approximately $316,872. A plan of the pier to be built is printed with the report of the Board for 1914 and a description of the work to be done is contained therein.

The Commission reports that expenditures on account of the construction of this pier up to Aug. 3, 1916, were substantially as follows: —

Total value of work done under contract No. 205 with W. H. Ellis & Son Company,	$248,443 75
Total payments to W. H. Ellis & Son Company,	$236,021 56
Total paid for work done under other contracts and agreements,	6,359 64
Paid for engineering and supervision,	14,500 00
Total expenditures,	$256,881 20
Unexpended balance,	93,118 80
Total authorized by act,	$350,000 00
5 per cent. retained on total value of work done under contract with W. H. Ellis & Son Company,	$12,422 19
Estimated amount required to complete contract with W. H. Ellis & Son Company,	71,556 25
Balance for all other purposes,	9,140 36
Unexpended balance,	$93,118 80

On Aug. 3, 1916, the contract with W. H. Ellis & Son Company was about 77½ per cent. completed. At this time the general situation with reference to the work covered by this contract was as follows: —

The pier was completed with the exception of 248 linear feet of upper wall on the south side; a short section of timber platform under the wall; fender piles and guard timber on the south side and outer end of pier; about 5,500 cubic yards of dredging; about 4,500 cubic yards of filling; mooring posts on south side; paving driveway.

The steel shed was erected and riveting nearly completed and about one-third of the roof plank was laid. The first and second floors of concrete, outer walls, doors, stairways, partitions, painting and all other requirements of the contract relating to the shed were uncompleted.

Work under this contract was to have been completed Feb. 1, 1916, but the time had been extended to Aug. 1, 1916, and a request for a further extension was under consideration.

In addition to the work done under this contract, the two-story frame building known as the immigration station had been moved to its permanent site at the head of the north dock and refitted for use. Tracks had been laid on the pier and connected with the main line operated by the New York, New Haven & Hartford railroad, and an agreement had been made with the city of New Bedford to lay water mains on the pier.

On Nov. 30, 1916, the expenditures on account of the construction of this pier were as follows: —

Total value of work done under contract with W. H. Ellis & Son Company,		$272,615 58
Total payments to W. H. Ellis & Son Company,		$258,984 80
Total paid for engineering and supervision,		15,176 74
Total paid for work done under other contracts and agreements,		8,730 80
Total expenditures,		$282,892 34
Unexpended balance,		$67,124 22
5 per cent. retained on contract with W. H. Ellis & Son Company,	$13,630 78	
Estimated amount required to complete contract with W. H. Ellis & Son Company,	47,384 42	
Balance,	6,109 02	
		$67,124 22

Work under this contract is about 85 per cent. completed.

During the year 14 sailing vessels from the Cape de Verde and Azores Islands have landed 1,168 immigrants at the station on the pier, under the supervision of the Federal authorities.

Operations by the Federal Government.

Operations and results during the fiscal year. — A contract was entered into for dredging along the southwesterly side of the harbor and for the removal of the ledge rock north of Palmers Island. Work commenced

May 3, 1916, and was in progress at the close of the fiscal year. The total expenditure was $6,282.96, all of which was for improvement.

Condition at the end of fiscal year. — At the close of the fiscal year about 91 per cent of the existing project had been completed. The main channel, 300 feet wide and 2.9 miles long, extending from the deep water in Buzzards Bay to just above the New Bedford and Fairhaven bridge, a turning basin 600 feet by 900 feet above the bridge, and an anchorage of 114 acres between New Bedford and Fairhaven have been dredged to 25 feet at mean low water, with the exception of a strip about 40 feet wide along the southwest side of the anchorage area, and the ledge of rock at the north end of Palmers Island. There is now a navigable depth of 25 feet from the bay to the city. No work has been done on that part of the project extending up the river to Belleville. All prior projects have been within the areas covered by the existing projects and consisted in deepening, first to 15 feet, then 18 feet, and finally to 25 feet, under the existing project.

Effect of improvement. — The effect of the deep water on commerce is the use of deeper draft vessels and larger cargoes. So far as known the improvement has had no effect on freight rates. A new large coal-producing corporation has secured wharf property on the city front and is making extensive improvements in coal-handling appliances, with a view to shipping direct from southern ports to New Bedford.

Proposed operations. — It is proposed to apply the available funds to dredging in the southwesterly part of the harbor and removing the ledge rock north of Palmers Island under a contract now in force, which will be completed about April, 1917. The completion of this contract and the removal of some additional outcroppings of ledge rock that have been discovered during the dredging, if found necessary with available funds, will complete the project, excepting the 18-foot channel extending from the turning basin above Fish Island up the Acushnet River to Belleville. No estimate is submitted for further work for the reason that the available funds are believed to be sufficient to complete the main part of the project and that the cooperation required for the 18-foot channel to Belleville has not been fulfilled.

Newburyport Harbor.

No work has been done by the Commonwealth in this harbor during the year.

Operations by the Federal Government.

Effect of improvement. — It is reported that the improvement made has reduced freight rates 25 cents per ton, and that if the projected depth of 17 feet at mean low water be obtained over the outer bar it would still further reduce the freight rates 15 to 25 cents per ton.

Proposed operations. — Due to settlement on account of storm seas both jetties require retopping in places, which it is estimated will require

about 16,000 tons of stone at $1.25 per ton, $20,000, which amount was appropriated by the river and harbor act approved July 27, 1916. It is expected that this work will all be completed during the calendar year 1917. No additional appropriation will be required for the year ending June 30, 1918.

Nobscusset Harbor, Dennis.

By chapter 351 of the Special Acts of 1915 the Board was authorized to make a survey and examination and to dredge a channel and anchorage basin in the harbor in the vicinity of Old Corporation Wharf, so called, in the town of Dennis, in such locations and to such depths as it might deem necessary and advisable.

A contract with John H. Gerrish, under date of Aug. 4, 1915, was subsequently entered into by the Board for dredging a channel and basin, the channel to extend from the 6-foot contour in Cape Cod Bay southwesterly about 800 feet to a proposed basin near the town landing, and to be 50 feet wide on the bottom and 6 feet deep at mean low water, the basin to be about 100 feet wide and 300 feet long on the bottom and 6 feet deep at mean low water. The amount of material to be removed, including the required slopes, was estimated to be about 50,000 cubic yards, scow measurement. The contract prices were: for dredging the channel and basin and disposing of the dredged material, including bowlders 1 cubic yard or less in volume, 18.3 cents for each cubic yard of material, measured in scows or in *situ;* for excavating bowlders in excess of 1 cubic yard and not greater than 5 cubic yards in volume, and disposing of the same, $8 for each cubic yard.

Under the terms of the contract work was to be completed Feb. 1, 1916. No work had been done upon that date and the contract was terminated during February, 1916. Proposals were readvertised and received by the Board on April 5, 1916. A contract for this work was entered into on April 11, 1916, with the Maryland Dredging and Contracting Company, at the following contract prices: for dredging, 27.53 cents per cubic yard measured in scows; for excavating bowlders, $9.50 per cubic yard; for dredging and disposing of the dredged material on land and flats, 27.53 cents per cubic yard measured in scows. This work is in progress.

In August, 1916, the Commission received a request from the selectmen of Dennis for an extension of the breakwater built under contract with W. H. Connor in 1915. An examination, survey and estimate of cost of this work have been made, but no further action was taken during the year on account of lack of available funds.

Amount expended during the year, $11,550.19.

Total expenditure to Dec. 1, 1916, $15,584.81.

North River, Salem.

The Board on June 21, 1916, gave a hearing on the petition of Collins Brothers and others, under chapter 481 of the Acts of 1909, for the dredging of North River, Salem, to a depth of 6 feet at mean low water from North bridge to a point near Essex bridge between Salem and Beverly.

The Commission reports that a survey has been made of this river and a report of the engineer presented. No further action has been taken.

Amount expended during the year, $682.30, which is the total amount expended to Dec. 1, 1916.

Oak Bluffs.

On June 14, 1916, a petition of the selectmen of Oak Bluffs and others, under chapter 481 of the Acts of 1909, for rip-rap protection along the shore from East Chop Light to Highland Wharf, Oak Bluffs, was presented to the Board. A hearing was given June 21, 1916.

The Commission on Nov. 28, 1916, directed that an examination and survey be made of this shore for the purpose of ascertaining the probable cost of the improvement petitioned for. No further action has been taken.

Total expenditure to Dec. 1, 1916, $462.50.

Plymouth Harbor.

On May 31, 1916, a petition of Andrew Kerr, under chapter 481 of the Acts of 1909, for extension of the channel in Plymouth Harbor from Goose Point Channel, so called, was presented to the Board. Hearing was held on this petition June 7, 1916. Proposals were received, and on June 29, 1916, a contract was entered into with the Boston Dredging Company for dredging an extension of this channel, the same to be 60 feet wide on the bottom and 12 feet deep at mean low water. The contract prices are: for dredging channel and disposing of the dredged material, 24.9 cents per cubic yard measured in scows; for excavating bowlders, $9.50 per cubic yard. Work is in progress.

There has been paid into the State treasury during the year by the United States government the sum of $26,500, being the unexpended balance of the amount contributed by the Commonwealth for the improvement of this harbor under chapter 132 of the Resolves of 1913.

Operations by the Federal Government.

Condition at the end of fiscal year. — In fiscal year 1916 the greater portion of the 9-foot basin not included in the 18-foot project was deepened to 15 feet at mean low water, with a cut 60 feet wide and 18 feet deep along the outer edge, the latter being for the convenience and at the expense of private interests.

Effect of improvement. — It is reported by the harbor master at Plymouth that the old 9-foot channel effected a saving of 50 cents per ton in freight rates. Owing to abnormal conditions in water freight rates at the present time the completion of the 18-foot channel has effected no reduction in water rates, but it has made possible the use of vessels of larger capacity.

Proposed operations. — The funds available will be held for maintenance of the existing channels and for repair of the beach protection on Long Beach, and being sufficient for any probable work that will be needed in the near future no estimate of additional funds required is submitted.

Popponnesset Bay.

On Aug. 1, 1916, proposals were received by the Board for dredging in Popponnesset Bay in the town of Barnstable and Mashpee.

The Commission reports that it executed a contract dated Aug. 2, 1916, with the Bay State Dredging and Contracting Company for dredging a channel at the entrance and inside this bay. The outer and inner channels are to be dredged 60 feet wide on the bottom and 6 feet deep at mean low water. The contract prices are: for dredging and disposing of the dredged material, 46.7 cents per cubic yard measured in scows; for excavating bowlders, $12 per cubic yard. Work is in progress.

Amount expended during the year, $5,384.64, which is the total expenditure to Dec. 1, 1916.

Provincetown Harbor.

No work has been done by the Commonwealth in this harbor during the year.

Operations by the Federal Government.

Condition at the end of fiscal year. — The net total of results accomplished under the previous and existing projects is a rubblestone beach protection at Long Point and a dike across House Point Island Flats. The temporary structures for catching and holding the sand have been practically destroyed.

Effect of improvement. — The object of the improvement is the preservation of this very excellent and important harbor of refuge. The effect of the improvement upon the commerce of the port is of minor consideration.

Proposed operations. — The funds available will be held for maintenance of the protective works, and, being sufficient for any probable repairs that may be needed in the near future, no estimate of additional funds required is submitted.

Red Brook Harbor, Bourne.

On April 22, 1916, a petition of the selectmen of Bourne, under chapter 481 of the Acts of 1909, for the removal of rocks and piles near the end of the town landing in Red Brook Harbor, Bourne, was received. Hearing was held on this petition on May 26, 1916.

The Commission on Nov. 14, 1916, considered a report of its engineer on this matter, and arrangements were subsequently made for removing these obstructions, at a cost of $275.

Salem Harbor.

No work has been done by the Commonwealth in this harbor during the year.

Operations by the Federal Government.

Operations and results during the fiscal year. — No operations were in progress and no expenditures made.

Condition at the end of fiscal year. — The net total of results accomplished under the previous and existing projects is a channel 10 feet deep at mean low water from that depth in the harbor to about opposite the outer end of Derby Wharf, 300 feet in width at the entrance, gradually narrowing to 200 feet; thence 8 feet deep at mean low water, gradually narrowing to 100 feet in width near the inner end of Derby Wharf, and thence 6 feet deep at mean low water and 50 feet wide to the head of navigation at Lafayette Street Bridge.

Effect of improvement. — It is not believed that the improvement has resulted in any reduction in freight rates, but greatly improved facilities for navigation have been provided.

Salt Pond River, Eastham.

Further hearing was held on May 26, 1916, by the Board, on petition of the selectmen of Eastham, under chapter 481 of the Acts of 1909, for improvement of the channel of Salt Pond River, in Eastham.

The Commission on Sept. 18, 1916, considered a report of its engineer on examination, survey and estimate of cost of improving this channel, but has taken no further action.

Amount expended during the year, $206.98.

Total expenditure to Dec. 1, 1916, $208.23.

Salters Point, Dartmouth.

On April 27, 1915, hearing was held by the Board on a petition of Alvin F. Waite and others, under chapter 481 of the Acts of 1909, for an extension of the breakwater built by the Commonwealth in 1914. A report, with estimate of cost of the suggested extension, was presented and considered, but without action during the year.

Further hearing was held on this petition by the Board on May 26, 1916. Proposals for the extension of this breakwater

were received, but the Board felt that before this improvement was carried out assurance should be received from the town of the establishment and maintenance of a public landing at Salters Point. Failing to receive such assurance no further action was taken and no work was contracted for.

Amount expended during the year, $48.87.

Total expenditure to Dec. 1, 1916, $15,009.59.

Sandwich Harbor.

On June 1, 1916, a petition of George F. Dennis, under chapter 481 of the Acts of 1909, for dredging and further improvement of Sandwich Harbor, was presented to the Board. Hearing was held, and on June 28, 1916, proposals were rereceived. The Board entered into a contract on July 5, 1916, with the Rockport Granite Company for repairing the easterly jetty at this harbor, and for an addition to the end of the westerly jetty. The contract price for furnishing the stone and depositing it in place in the jetties was $2.40 per ton of 2,000 pounds.

The Commission reports that work was completed Sept. 15, 1916, at a cost of $4,600.80.

Amount expended during the year, $6,254.88.

Total expenditure to Dec. 1, 1916, $57,355.82.

Scituate Sea Walls.

In 1907 and 1908, the Commonwealth built stone rip-rap protection for the bluff at the southerly end of the Third Cliff in Scituate. On Sept. 8, 1915, a petition of Howard R. Guild, under chapter 481 of the Acts of 1909, for repair work at the southerly end of this cliff, was presented. Hearing was held on Sept. 15, 1915. An examination of the locality and an estimate of the probable cost having been prepared, and contributions amounting to $235 having been made toward the cost of the work, on Nov. 2, 1915, a contract was entered into with Dennis F. Crowley for the repairing of rip-rap on the southerly shore of this cliff. The contract price for furnishing stone and depositing it in place was $2.45 for each ton of 2,000 pounds. Work was completed April 18, 1916, at a cost of $735.

On May 26, 1916, hearing was held in relation to petitions, under chapter 481 of the Acts of 1909, for sea walls at Cedar Point and North Scituate. Proposals were received Aug. 1, 1916.

The Commission reports that it executed a contract, dated Aug. 2, 1916, with Dennis F. Crowley, for the construction of concrete sea walls with spur jetties on the shore at Cedar Point and North Scituate, the wall at Cedar Point to be built along the shore from the present concrete wall southerly a distance of 500 feet; at North Scituate the wall to be built along the shore between existing walls for a distance of about 368 feet. Work was completed Oct. 28, 1916, at a cost of $7,048.40.

A request has been made to the Commission for an addition to this breakwater at Cedar Point, but no further action has been taken in relation to the matter.

Amount expended during the year, $6,892.41.

Total expenditure to Dec. 1, 1916, $49,576.43.

Taunton River.

The recommendation that Taunton River from Fall River to Weir Village in Taunton be improved by providing a channel not less than 100 feet in width and not less than 18 feet deep at mean low water, with rectification of bends and a wider basin at the upper extremity of the channel, and that the necessary work be carried out in co-operation between the Commonwealth of Massachusetts, the Federal government and municipalities, was set forth in the special report of the Board printed as House Document No. 2138 of 1913. This was followed by the passage of chapter 716 of the Acts of 1914, allowing an expenditure of $100,000 for the improvement for navigation of that part of the river named above, and for payment for land purchased or taken, for land damages and other rights, and for the privilege of depositing material on land and flats of and adjoining the river, "*provided*, that no part of this fund shall be available or expended until the congress of the United States shall approve a project, and make appropriation therefor, to improve that part of said river extending from Fall River to Weir Vil-

lage in Taunton by the construction of a continuous channel therein."

On Oct. 15, 1915, the Board attended a public hearing held by Col. John Millis, Corps of Engineers, U. S. A., at Taunton in relation to a report in preparation by him as to further improvement of this river from Fall River to Weir Village in Taunton under authority of an act of Congress. It was pointed out by Colonel Millis that favorable action by the State with respect to a waterway between Taunton and Brockton, extended eventually either to North River or to Boston Harbor, following surveys, examinations and estimates of cost made by this Board, would have an important bearing upon the question of the advisability of further improvement by the Federal government of Taunton River from Fall River to Weir Village.

In accordance with the provisions of the River and Harbor Act of March 4, 1913, Col. John Millis, Corps of Engineers, U. S. A., submitted his report, dated June 30, 1916, which is, in part, as follows: —

1. This survey was authorized by letter from the Acting Chief of Engineers of Jan. 19, 1914 (E. D. 7611-27), under a provision in the River and Harbor Act of March 4, 1913, for examination and survey of "Taunton River, Massachusetts, from its mouth to the head of navigation at Weir Village, with a view of securing a channel of 25 feet depth, or of such depth as may be considered advisable in the interest of commerce." The report of the preliminary examination was submitted Dec. 20, 1913.

2. In the report of the preliminary examination it was recommended that a survey and estimates be made to determine the cost of improvement on the basis of a channel which would have a minimum width of 100 feet and a minimum depth of 18 feet at mean low water. The survey and estimate have been made having in view these dimensions. The survey was made from April to October, 1914, by a party under the charge of Mr. D. F. Hassis, superintendent. Soundings were made to cover the portions of the proposed channel where sufficient data were not already available, borings were made to test the nature of the material that would have to be excavated to obtain the proposed depth and width of channel, and sufficient topography was taken to develop the low points of land that might be taken for straightening the river.

3. The general results of the survey and the location of the proposed channel are shown on the map (in three sheets) herewith. Detailed sheets have also been prepared on a large scale to show all the soundings for use in preparing estimates. Below Forrest Hill, between Somerset and

Fall River, the information is taken from the United States Coast and Geodetic Survey Chart No. 353.

4. The material to be excavated is mud, sand, gravel and clay, with a considerable extent of ledge rock in the vicinity of Peters Point just above the town of Dighton. It will be practicable to dispose of the dredged material by bulkheading certain areas of flats along the river for dumping grounds. Some of the material could be pumped directly into these grounds, but the greater portion will have to be dredged and rehandled.

5. The proposed channel has been laid out so as to eliminate the sharpest bends in the river and at the same time utilize as far as possible the best depth of water. The bottom width given the channel is 100 feet, with enlargements at the bends. Within the limits of Weir Village this will occupy nearly the full width of the river to the wharf lines. The estimates contemplate that the local interests should provide for all damage to existing structures, and to the building and rearranging of all wharves or other property. A turning basin 250 feet square is provided at Weir, but all bulkheads or retaining walls, to avoid taking too much land for this purpose, are to be provided by the local interests. A location for the turning basins is indicated on the maps, but this should properly be a subject of more detailed consideration at the time of its construction, as the location indicated may possibly be modified to better adapt it to local conditions.

6. The estimated cost of the work is as follows: —

Dredging 957,124 cubic yards of mud, sand and gravel at 11 cents per cubic yard,	$105,283 64
Dredging 3,181,508 cubic yards of mud, sand, gravel and clay at 22 cents per cubic yard,	699,931 76
Rock excavation, 53,424 cubic yards at $8.80 per cubic yard,	470,131 20
Removal of 3,000 cubic yards of bowlders at $8 per cubic yard,	26,400 00
	$1,301,746 60

Maintenance estimated at $10,000 per year.

10. The total value of the existing commerce on the Taunton River is a little less than $500,000 yearly. The total expenditure by the United States for the improvement of the river to date is $200,947.08.

13. The existing project for the improvement of the Taunton River from its mouth to Weir Village, just below Taunton, contemplates a channel 12 feet deep at mean high water and 100 feet wide from the mouth of the river to Berkley bridge, about 1 mile above Dighton; thence same depth and 80 feet wide, with enlargement at the bends to 100 feet to Briggs shoal; thence same width and 11 feet deep to the ship yard at Weir Village; thence same depth and 60 feet wide to Weir bridge, at a total estimated cost of $125,000.

14. Until such time as the matter of a through waterway between Narragansett Bay and Boston Harbor may be taken up for actual consideration, I believe that an expansion of this project in the way of increased depth and width of channel in the Taunton River is not warrantable, and therefore the improvement of the Taunton River as contemplated under the provisions of the River and Harbor Act of March 4, 1913, is not worthy of being undertaken by the Federal government at the present time, on account of the limited benefits that would result from such improvements and the great cost of making them. I believe, however, that the subject should be further considered in connection with future consideration by the State of the through waterway as above. I am informally advised that the above recommendation conforms to the views of the Massachusetts Board of Harbor and Land Commissioners.

15. Attention is invited to the fact that the harbor of Boston is almost unique among seacoast harbors of the United States of corresponding commercial importance in having no connection with the inland waterway system of the country and to the very extensive connections that would be assured by completing the gap that now exists between the Taunton River and the North River and the extension of a branch to Brockton. Boston and other towns of New England would then be linked up with a very extensive inland waterways system.

By chapter 80 of the Resolves of 1916 provision was made that the sum of $100,000, provided by chapter 716 of the Acts of 1914, should be available for the purposes and subject to the conditions stated in said act for the period of three years after the passage of this resolve.

Total expenditure to Dec. 1, 1916, $1,960.51.

Operations by the Federal Government.

Operations and results during the fiscal year. — No works of improvement have been in progress during the year pending the result of an examination and survey with a view to further improvement.

Condition at the end of fiscal year. — The channel has suffered some deterioration in depth and width. It is claimed by those using the channel constantly that it can not be used safely by vessels drawing more than 9 feet intending to make the round trip on one tide.

Effect of improvement. — The deepening and widening of the channel enables vessels of light draft to carry full cargoes to Taunton without, as previously, lightering at Fall River. So far as known the improvement has had no effect on freight rates.

Proposed operations. — It is proposed to use the available funds in removing bowlders and dredging at points where the greatest deterioration has occurred, which it is believed will be sufficient for all maintenance contemplated at present.

Taunton and Brockton Waterway.

By chapter 103 of the Resolves of 1915 the Board was authorized to make such examinations and surveys as it might deem necessary of that part of the Taunton River from Weir Village in the city of Taunton to the dam across said river in that part of the town of Bridgewater known as Pratttown, and of the territory lying between said dam and the city of Brockton, for the purpose of determining the advisability, practicability and approximate cost of providing a continuous waterway between Taunton River and the city of Brockton, utilizing wholly or in part Taunton River as far as said dam and constructing in connection with said river a canal between said dam and the city of Taunton. The Board was authorized to expend for the purpose of the resolve a sum not exceeding $2,500, and directed to report the result of its examination and survey to the Legislature on or before the second Wednesday in January, 1916.

By chapter 21 of the Resolves of 1916 the time within which the report required by the provisions of chapter 103 of the Resolves of 1915 was to be submitted was extended to April 10, 1916, and the Board was further authorized to expend for the purpose, in addition to the appropriation heretofore authorized, a sum not exceeding $2,000, to be paid from the unexpended balance of the appropriation made to carry out the provisions of chapter 112 of the Resolves of 1914.

On April 10, 1916, the Board presented its special report in accordance with the provisions of chapter 103 of the Resolves of 1915, which was printed as House Document No. 2126 of 1916.

Amount expended during the year, $2,219.10.

Total expenditure to Dec. 1, 1916, $5,278.18.

Taunton River–Massachusetts Bay Canal.

By chapter 135 of the Resolves of 1916 the Board was authorized to "make such further surveys and examinations of the territory between Taunton river and North river as it may deem necessary, and to prepare estimates of the probable cost of a waterway from Taunton river to Massachusetts bay by the

construction of a canal from Taunton river to North river and the canalization of various rivers to Boston harbor. The board may expend for the purposes of this resolve such amount as it may deem advisable, not, however, exceeding five thousand dollars, from such appropriation as may be made at the present session of the general court for the further improvement and protection by the Board of rivers, harbors, tide waters and foreshores."

In October, 1916, the Commission made an allotment of $5,000 from the appropriation under chapter 318 of the Special Acts of 1916, for carrying on the work authorized by this resolve.

The field work of the survey has been commenced and the base line cut out and stations marked from the Taunton River to a point near the railroad station in the town of Whitman, a distance of 10½ miles. The base line will be continued later to tidewater in Weymouth Fore River, in Boston Harbor.

It is expected to complete the entire survey early in 1917, as winter is favorable for work of this character, when the swamps and wet ground are frozen and the trees bare of leaves.

Amount expended during the year, $552.87, which is the total expenditure to Dec. 1, 1916.

Vineyard Haven Sea Wall.

On Nov. 11, 1915, a contract was entered into with Herbert N. Hinckley for the extension of a concrete sea wall, under construction at that date, to begin at the southerly end of the existing concrete wall built by the State and extend in a southwesterly direction about 110 feet. The contract price for furnishing materials and building this wall, including the cost of reinforcing steel, tile drains, excavation, back filling, disposal of surplus material, furnishing, erecting and removing forms, and all incidental work, was $9 for each cubic yard of concrete measured in place in the completed work. Work was completed Dec. 7, 1915, at a cost of $749.

Amount expended during the year, $2,450.93.

Total expenditure to Dec. 1, 1916, $9,393.12.

Waquoit Bay.

On May 26, 1916, further hearing was held by the Board on petition of D. E. Butler and others, and of the selectmen of Falmouth, under chapter 481 of the Acts of 1909, for cutting a channel through the beach from the Sound into Waquoit Bay. Plans and estimates of the cost of certain jetty work were prepared and proposals received on July 19, 1916.

The Commission reports that it executed a contract, dated Aug. 2, 1916, with John R. Burke, for the construction of a breakwater, stone wall and timber bulkhead, at the entrance to this bay in the towns of Falmouth and Mashpee. The contract prices are: for furnishing the stone and depositing the same in place in the breakwater, $2.95 per ton; for furnishing stone and depositing the same in place in the wall, $3.95 per ton; for furnishing materials and building the timber bulkhead and groins, $4.90 per linear foot. Work is in progress.

Amount expended during the year, $346.13.

Total expenditure to Dec. 1, 1916, $1,418.52.

Wareham River.

A report in relation to this river is contained in House Document No. 1850 of 1915.

On May 26, 1916, hearing was held on petitions under chapter 481 of the Acts of 1909 for the dredging of a channel in this river. Proposals for the work were received June 14, 1916, but were rejected as excessive in price. Other proposals were received by the Board on June 21, 1916, and a contract entered into June 28, 1916, with Charles M. Cole for dredging a channel in this river from the 12-foot contour opposite the mouth of Weweantic River to the highway bridge at the Narrows, to be 100 feet wide on the bottom, except at the turns, where it is to be increased to 150 feet, the entire dredging to be to a depth of 12 feet at mean low water. The contract prices are: for dredging the channel and disposing of the dredged material,

29.49 cents per cubic yard, scow measurement; for excavating bowlders, $9.50 per cubic yard. This work is in progress.

Amount expended during the year, $18,051.64.

Total expenditure to Dec. 1, 1916, $18,993.08.

Warrens Cove, Plymouth.

A contract was entered into by the Board Nov. 5, 1915, with Dennis F. Crowley, to extend the sea wall at Warrens Cove, Plymouth, previously built by the Commonwealth, in an easterly direction about 490 feet, and to build spur jetties in connection with said wall. The contract price for furnishing materials and building the wall and spur jetties, including the cost of excavation, etc., was $5.70 per cubic yard of concrete measured in place in the completed work. Work was completed Feb. 2, 1916, at a total cost of $4,172.97.

On May 25, 1916, a hearing was held on petition of P. F. Brine, under chapter 481 of the Acts of 1909, for an extension of the sea wall built by the Commonwealth. Proposals were received on June 14, 1916, and on June 15, 1916, a contract was entered into with Cecil M. Leach for the construction of a concrete sea wall, with spur jetties, on the shore of this cove, extending from the southerly end of the wall built in 1915 along the shore in a southeasterly direction. The contract prices for this work are: for furnishing materials for building the concrete sea wall, $7.93 for each cubic yard of concrete measured in place in the completed work; for oak piles furnished, driven, fitted and fastened in place, 45 cents per linear foot of pile. This work is in progress.

Amount expended during the year, $7,722.25.

Total expenditure to Dec. 1, 1916, $9,760.84.

Wellfleet Harbor.

By chapter 121 of the Resolves of 1915 the Board was authorized to dredge and improve this harbor, at an expense not exceeding $18,000, of which amount $16,500 is to be paid by the Commonwealth and $1,500 appropriated by the town of Wellfleet.

A contract was entered into by the Board under date of Aug. 4, 1915, with John H. Gerrish, to dredge a channel and basin, the channel to extend from the 6-foot contour in the harbor northerly about 2,400 feet to the proposed basin near the town landing, and to be 50 feet wide on the bottom and 6 feet deep at mean low water, the basin to be about 250 feet wide and 400 feet long on the bottom and 6 feet deep at mean low water.

Under the terms of the contract work was to be completed Jan. 1, 1916. At that time very little had been done and the contract was terminated in February, 1916. Work was readvertised and proposals received on April 5, 1916. Subsequently, a contract under date of April 11, 1916, was entered into with the Maryland Dredging and Contracting Company, the contract prices being: for dredging a channel and basin and disposing of the dredged material, 19.53 cents per cubic yard measured in scows; for excavating bowlders, $9.50 per cubic yard. Work was completed Sept. 21, 1916, at a cost of $14,759.21.

Amount expended during the year, $16,799.10.

Total expenditure to Dec. 1, 1916, $17,363.48.

Westfield River.

By chapter 128 of the Resolves of 1916 the Board was authorized and directed to expend a sum not exceeding $5,000 in placing rip-rap on the banks of the Westfield River, and in such other work for the protection, regulation and control of the river as the Board may deem necessary or advisable.

On Sept. 26, 1916, W. F. Williams, engineer, presented to the Commission the following report: —

The county bridge crosses the Westfield River about 2 miles below the center of the town of Westfield, and is on the main highway between this town and Springfield. About 1,000 feet above the bridge the river makes an abrupt turn to the south, which has caused a considerable erosion of the easterly bank, until now the river approaches the bridge at a sharp angle from the east and may undermine the roadway and easterly abutment.

A gravel bar has formed in the original channel of the river above the bridge which is also assisting in forcing the river further to the east into the soft alluvial soil of the meadow land on that side of the river.

At high stages of the river the water enters an old water course and crosses the road east of the bridge, and there is some danger that it may ultimately cut a new channel in that direction.

In my opinion the river has already moved too far to the east to make it safe to attempt to hold it in its present location by rip-rapping the easterly bank above the bridge. I think it is desirable to force the channel back into its old position so that the flow will be directly through the bridge opening and not around the abutment as at present. Therefore I would advise building six spur jetties about 100 feet apart and 50 feet long, of heavy quarry split stone, at right angles to the easterly bank. These jetties will collect material and gradually restore the bank, forcing the flow of the river to the west and scouring out the gravel bar referred to.

The inshore end of the jetties should be carried to the top of the bank, but the outer end need not be brought above the present water level. The length of the jetties is more or less a matter of experiment. It is better to have them too short rather than too long as they can be easily extended.

I estimate that it will require about 1,000 tons of stone to build the jetties, and I find that suitable material can be secured from a near-by quarry on the line of the Boston & Albany railroad, which also has a siding within a short haul of the site of the proposed jetties.

The estimated cost of the work is as follows: —

1,000 tons quarry rubble stone in place, at $2.50, ...	$2,500 00
Engineering and supervision, ...	300 00
Total, ...	$2,800 00

At the request of the Commission a further report suggesting a method to afford temporary relief was presented: —

In extension of my report of September 26 on the protection of the easterly bank of the Westfield River near the county bridge in the town of Westfield, I would suggest as a temporary relief that a ditch be excavated through the gravel bank on the south side of the river above the turn, so as to divert the flow into what was apparently an old location of the channel leading directly to the west opening under the bridge.

If this work can be done at once, so that the flow may be diverted through the proposed cut-off before the freshets for which this river is quite noted take place, it may result in a complete relocation of the river.

The ditch will be about 300 feet long and should be at least 30 feet wide on the bottom, and will probably cost about $1,000.

The Commission made inspection of this river on Oct. 4, 1916, and on November 6 concluded to set aside $500 from the

appropriation under the above chapter for rip-rap work near the county bridge. As yet the Commission has not been able to find any contractor to undertake this work on account of the difficulty of securing labor.

Amount expended during the year, $120.43, which is the total expenditure to Dec. 1, 1916.

Winthrop Sea Wall.

By chapter 139 of the Resolves of 1915 the Board was authorized to provide for the building of a sea wall in the town of Winthrop along the shore of Broad Sound on the easterly side of Point Shirley, and to expend for the purpose a sum not exceeding $18,000, of which amount $15,000 was to be paid by the Commonwealth and $3,000 appropriated by the town of Winthrop.

On Nov. 5, 1915, a contract was entered into with the William L. Miller Company for the construction of a concrete sea wall, timber bulkheads and timber jetties, the proposed wall to begin about 1,150 feet southerly from the existing wall and to extend in a southerly direction about 1,030 feet, with timber bulkheads on the inshore side of both ends of the wall and timber jetties extending from the easterly face of the wall. The contract prices were: for furnishing the materials and building the concrete sea wall, including excavation, back filling, furnishing, erecting and removing forms, and all incidental work, $6.09 for each cubic yard of concrete measured in place in the completed work; for furnishing materials and building seven jetties of yellow pine timber and oak piles, including coating piles and timber, excavating, back filling and all incidental work, $6.50 for each linear foot of pile and timber jetty in place; for furnishing materials and building two bulkheads of yellow pine timber and oak piles, including coating piles and timber, excavating, back filling and all incidental work, $6.33 for each linear foot of pile and timber bulkhead in place.

Work was completed July 29, 1916, at a cost of $17,284.08.

Amount expended during the year, $18,284.92.

Total expenditure to Dec. 1, 1916, $18,481.62.

YARMOUTHPORT HARBOR.

On May 26, 1916, hearing was held by the Board in relation to the improvement of Yarmouthport Harbor. On July 5 and 19, 1916, the Board received proposals for dredging a channel to extend from the 6-foot contour on the easterly side of the main channel in Barnstable Harbor, about 5,200 feet to the town landing at the mouth of Mill Creek in Yarmouth, the channel to be 6 feet deep at mean low water and not less than 40 feet wide on the bottom. All proposals were subsequently rejected by the Board as excessive in price.

The Commission reports that no further action has been taken during the year in relation to this improvement.

Amount expended during the year, $308.58, which is the total expenditure to Dec. 1, 1916.

MISCELLANEOUS MATTERS.

Great Ponds.

The jurisdiction of the Board over great ponds belonging to the Commonwealth, these ponds containing in their natural state 10 or more acres of land, was conferred by chapter 318 of the Acts of 1888. Further authority was given by chapter 379 of the Acts of 1904, allowing the Board, subject to the approval of the Governor and Council, to sell and convey or lease any of the islands owned by the State in the great ponds.

During the year examinations have been made, conferences and hearings held and other proceedings taken relative to Bates Pond, Carver; Center Lake, Becket; East and West Monponsett Ponds, Halifax and Hanson; Farm Pond, Sherborn; Great Herring Pond, Plymouth and Bourne; Great Island Pond, Plymouth; Lake Quinsigamond, Shrewsbury and Worcester; Lake Saltonstall, Haverhill; Little Herring Pond, Plymouth; Little Island Pond, Plymouth; Long Pond, Brewster; Long Pond, Harwich; Morse Pond, Wellesley; Pomps Pond, Andover; Sampsons Pond, Carver; Sheep Pond, Brewster; Silver Lake, Pittsfield; Swan Pond, Dennis; Tyngs Pond, Dracut; Wenham Pond, Carver; West Pond, Bolton; Yokum Pond, Becket.

The Commission concurs in the views expressed by the Board in its annual report for 1915, which were as follows: —

Many of the great ponds are of importance as sources of supply for flowing cranberry bogs, and the shores and surrounding lands, as well as the islands therein, have increased largely in value during recent years and become desirable locations for camps and permanent residences

In the exercise of its powers and duties with reference to the majority of cases concerning great ponds and the islands therein the Board is restricted in its activities, owing to the fact that accurate and complete surveys, maps and plans of only a few of these ponds have been made by the Commonwealth. Neither is the Board always able to report as fully as is desirable to the Attorney-General, at his request, facts and information needed by that official for a determination of questions of ownership by the State or of public rights involved in certain petitions of private parties to the Land Court for registration of title.

The Board therefore again recommends that it be given the necessary authority to make surveys, examinations, maps and plans of the great ponds of the Commonwealth containing 10 or more acres of land, also of the islands in said ponds, and to ascertain, so far as is practicable, the location, extent and description of the lands, shores and islands in said ponds, and that an appropriation therefor be made.

Province Lands.

By chapter 470 of the Acts of 1893 the Board was given the general care and supervision of so much of the Province Lands at Provincetown as lie northerly and westerly of the line described in the act, together with authority to fix bounds, to establish regulations for the care of the lands and to appoint a superintendent, the whole territory comprising about 3,290 acres.

The Board has stated in previous reports that in 1893, under an appropriation of $2,000 made by the act aforesaid, the work of reclamation on these lands was begun in order to "stop the shifting sands which move like drifting snow, and cover these barren sections with vegetable growth."

The methods of dealing with the problem of reclamation of the shifting dunes, worked out in the early years by careful experience and under the advice of government experts, have been those followed since, with only the slight modifications due to changing conditions. The barren dunes are first planted with beach grass, which prevents movement of the sand. When this growth is sufficiently sturdy it is reinforced by the transplanting of certain trees and shrubs, taken in part from a nursery established upon these lands. Scotch broom, bayberry, Scotch, Austrian and native pines have proven most valuable for this purpose.

The Commission has examined this territory and reports that during the year the work of reclamation has been carried on in accordance with the methods outlined, — about 39 acres having been covered with grass and 13,000 pines on the sod and 12,000 Scotch broom transplanted.

A continuation of the work of the past has resulted in a large decrease of both the gypsy and the brown-tail moths on these lands.

The sum of $165.39 has been paid into the State treasury during the year, being the amount received from licenses issued to various parties to cultivate and pick cranberries on the bogs, and to mow meadow lands.

Amount expended during the year, $2,568.06.

Total expenditure to Dec. 1, 1916, $68,136.66.

State Boundaries.

In 1915 the Board reported upon the perambulation of the boundary lines of the Commonwealth, made in accordance with the provisions of chapter 1 of the Revised Laws, section 4, and recommended an additional appropriation for the repair and resetting of bounds upon the New York, Vermont and New Hampshire lines. This appropriation was made by chapter 34 of the Resolves of 1916, as follows: —

Resolved, That there be allowed and paid out of the treasury of the commonwealth a sum not exceeding fifteen hundred dollars for paying one half the cost of setting new bounds, resetting and repairing existing bounds, cutting and removing trees and undergrowth, and any other necessary work, on, near and along various parts of the boundary lines between the commonwealth of Massachusetts and the states of New York, Vermont and New Hampshire; the said work to be done under the direction of the board of harbor and land commissioners and the duly authorized agents or representatives of the states of New York, Vermont and New Hampshire: *provided, however*, that no part of this sum shall be available or expended until evidence is presented to the auditor of the commonwealth that there has been appropriated or contributed and made available for use by the states of New York, Vermont and New Hampshire the sum of fifteen hundred dollars for the purpose of paying one half the cost of the work aforesaid. [*Approved April 3, 1916.*

The work authorized has been substantially completed in accordance with the provisions of the above resolve.

Massachusetts Atlas Sheets and Town Boundary Atlases.

Under authority of chapter 57, Resolves of 1890, chapter 42, Resolves of 1891, and chapter 360, Acts of 1900, 3,381 atlas sheets of the map of the Commonwealth and 4 town boundary atlases have been sold during the year, for which $334.60 was received. Under the provisions of chapter 26, Resolves of 1909,

there has been expended from this amount $183 for the purchase from the United States Geological Survey of sheets required to keep in stock at all times copies of all the atlas sheets, leaving a balance of $151.60, which has been forwarded to the Treasurer and Receiver-General, as required by the resolve.

One hundred and fifty-eight atlases have been delivered during the year, under authority of chapter 360, Acts of 1900, as amended by chapter 484, Acts of 1909.

Chapter 69 of the Resolves of 1915 authorized and directed the Board to make necessary changes in and additions to the atlas sheets comprising the topographical map of Massachusetts prepared by the United States Geological Survey; to publish an edition or editions of these atlas sheets with changes and additions, and to sell to the public the corrected sheets.

An expenditure of not exceeding $10,000 was allowed.

The Commission reports that arrangements have been made with E. O. Cockayne, to print 108,000 copies of the 54 corrected sheets of the topographical map of Massachusetts.

The corrections and additions are nearly completed on all of the sheets, and arrangements are now being made with the United States Geological Survey to furnish the printer with transfers from the original copper plates, as required by him to prepare his plates for printing the corrected edition.

The corrections and additions have been made from information on file in this department and in other departments of the Commonwealth, and also from data furnished by the city engineers of the cities of the State and various private parties. No surveys have been made in the field.

Amount expended during the year, $2,808, which is the total expenditure to Dec. 1, 1916.

Cape Cod Canal.

Under the provisions of chapter 448 of the Acts of 1899, incorporating the Boston, Cape Cod & New York Canal Company, the Board of Railroad Commissioners and the Board of Harbor and Land Commissioners were constituted a Joint Board for the purposes defined in said act. The Commission

on Waterways and Public Lands since Aug. 3, 1916, have, with the Public Service Commission, exercised the powers and duties of the Joint Board. John N. Cole was elected chairman of the Joint Board on Aug. 30, 1916.

The act of 1899 was amended by chapter 476 of the Acts of 1900. Additional legislation is contained in chapter 519 of the Acts of 1910. Statements covering previous proceedings before the Board of Harbor and Land Commissioners and the Joint Board, and action taken on the several petitions presented, are contained in the reports of the Board of Harbor and Land Commissioners for the years 1907, pages 98 to 104; 1909, pages 17 to 19; 1910, pages 34 to 38; 1911, pages 65 to 68; 1912, pages 74 to 77; 1913, pages 160 to 162; 1914, pages 87 to 91; 1915, pages 106 to 108.

The Joint Board has authorized under its orders the issue by the Canal Company up to Nov. 30, 1916, of 53,820 shares of stock of the par value of $100 each and $5,390,000 in bonds. These orders were made in accordance with the requirements of chapter 448 of the Acts of 1899, as amended by chapter 476 of the Acts of 1900, and upon requisition of the Cape Cod Construction Company to the Canal Company for the amounts of stock and bonds of the Canal Company under and in accordance with the contract between the Canal Company and the Construction Company, dated March 27, 1907, for the construction of the canal, accompanied by estimates prepared by the chief engineer of the Canal Company of the amount of work done and expenditures made which had previously been examined and verified by the Joint Board and the engineer. Requisitions relating to additional issues of stock and bonds, aggregating 6,080 shares of stock of the par value of $100 each and $610,000 in bonds, are still pending, the necessary orders having been withheld, pending a determination of the question of a lock, tidal gates or other device for controlling the current of the canal, and of other matters.

On June 3, 1915, an order was issued by the Joint Board allowing the Canal Company a further period of time, to Dec. 31, 1915, inclusive, for completing the canal.

Similar orders extending the time for the above purpose have been issued, as follows: Dec. 6, 1915, to March 31, 1916;

March 28, 1916, to May 1, 1916; April 24, 1916, to June 1, 1916; May 31, 1916, to June 30, 1916; June 28, 1916, to Sept. 1, 1916; Aug. 30, 1916, to Nov. 1, 1916; Oct. 30, 1916, to Jan. 1, 1917.

Certain correspondence passed, and inquiries were made during the year 1916 previous to August 3, concerning shoals within the dumping ground in Buzzards Bay between Abiel's Ledge and Dry Ledge, used for dumping material dredged from the canal under permit from the Board of Harbor and Land Commissioners, dated Jan. 3, 1912, it being alleged that these shoals were caused by the dumping done by the Canal Company at variance with the provisions of said permit. This matter has been taken up during the year by the Board of Harbor and Land Commissioners and adjusted. Numerous hearings and conferences have been held during the year on the subjects of tidal current in the canal, lock, etc., contained in a special report made to the Joint Board by its engineer, W. F. Williams, under date of March 13, 1916. Attention has been given to an opinion of the Attorney-General with respect to the provisions of the contract between the Canal Company and the Cape Cod Construction Company, approved by the Joint Board June 3, 1907, for the construction of the canal.

LICENSES GRANTED BY THE BOARD OF HARBOR AND LAND COMMISSIONERS FROM DEC. 1, 1915, TO AUG. 3, 1916.

Nos.

4021. Petition of the Massachusetts Highway Commission for approval of plans for the building of a pile bridge across the outlet of Sengekontacket Pond in the towns of Oak Bluffs and Edgartown, as authorized by chapter 173 of the General Acts of 1915. Granted Dec. 7, 1915.

4022. Petition of the Bay State Street Railway Company for license to lay and maintain cables in Merrimac River, Haverhill. Granted Dec. 15, 1915.

4023. Petition of the Bay State Street Railway Company for license to lay and maintain cables in Merrimac River at Groveland Bridge, Haverhill and Groveland. Granted Dec. 15, 1915.

4024. Petition of the Bay State Street Railway Company for license to lay and maintain cables in Merrimac River at Bradford Bridge, Haverhill. Granted Dec. 15, 1915.

Nos.

4025. Petition of the Magnolia Beach Associates for license to lay and maintain a 6-inch pipe below the surface of the beach at the premises of said Associates at Magnolia, Manchester. Granted Dec. 29, 1915.

4026. Petition of Harry W. Dudley and J. Samuel Hodge for license to construct an intake and lay a pipe below the surface of the beach at their premises in Revere. Granted Dec. 29, 1915.

4027. Petition of the Rockport Granite Company for license to extend its wharf and breakwater in Hodgkins Cove in that part of the city of Gloucester called Bay View, and to maintain that part of said wharf and breakwater now built. Granted Feb. 2, 1916.

4028. Petition of the county commissioners of the county of Essex for license to reconstruct Essex bridge, so called, in and over Danvers River, Salem and Beverly. Granted Feb. 2, 1916.

4029. Petition of the city of Haverhill for license to construct a sewer in and under Saltonstall Lake, Haverhill. Granted Feb. 15, 1916.

4030. Petition of the Plymouth Cordage Company for license to construct pile dolphins and to drive piles in Plymouth Harbor near its wharf in Plymouth. Granted Feb. 24, 1916.

4031. Petition of Barney R. Simons for license to build a pile wharf and float stage in Lake Anthony, Oak Bluffs. Granted Feb. 24, 1916.

4032. Petition of the Newburyport Gas and Electric Company for license to extend its wharf by building bulkheads and filling solid on Merrimac River, Newburyport. Granted Feb. 24, 1916.

4033. Petition of the Knight Grain Company for license to build bulkheads and pile wharves and to fill solid on Merrimac River, Newburyport. Granted Feb. 29, 1916.

4034. Petition of Alice M. Brooks for license to build a bulkhead and pile wharf and fill solid on Merrimac River, Newburyport. Granted Feb. 29, 1916.

4035. Petition of the Point of Pines Yacht Club, Incorporated, for license to build a concrete wall, to drive piles and to fill solid on Saugus River, Revere. Granted Feb. 29, 1916.

4036. Petition of the town of Oak Bluffs for license to extend the present town pier in Nantucket Sound, Oak Bluffs. Granted March 14, 1916.

4037. Petition of Thomas Taggart for license to build a sea wall, a pile and timber bulkhead and pile and timber jetties in Hyannis Harbor at Hyannisport, Barnstable. Granted March 14, 1916.

4038. Petition of the city of Worcester for approval of plans for the construction of a reinforced concrete bridge across Lake Quinsigamond, between the city of Worcester and town of Shrewsbury, as authorized by chapter 302 of the General Acts of 1915. Granted March 14, 1916.

Nos.

4039. Petition of the Pocahontas Fuel Company for license to build pile and timber structures, and to dredge, on Acushnet River, New Bedford. Granted March 21, 1916.

4040. Petition of Adolph J. Jantzen for license to build a boat landing and float stage on Taunton River, Somerset. Granted April 4, 1916.

4041. Petition of Anita D. Forster for license to build a stone pier and float stage in Marion Harbor, Marion. Granted April 4, 1916.

4042. Petition of Morgan L. Cooley for license to build a bulkhead and fill solid in Furnace Pond, Pembroke. Granted April 4, 1916.

4043. Petition of Boston, Cape Cod & New York Canal Company for license to maintain dolphins on westerly side of approach channel to Cape Cod Canal in Buzzards Bay, Bourne. Granted April 4, 1916.

4044. Petition of the Vineyard Grove Company for license to build a pile pier and platform in Nantucket Sound, Oak Bluffs. Granted April 4, 1916.

4045. Petition of the Lynn Gas and Electric Company for license to extend its wharf by building a sea wall and pile and timber bulkhead and filling solid in Lynn Harbor, Lynn. Granted April 4, 1916.

4046. Petition of the United Electric Company for license to build a retaining crib and to lay suction intakes in Connecticut River, Springfield. Granted April 4, 1916.

4047. Petition of the Chatham Cold Storage and Weir Company for license to build pile and timber bulkheads and a marine railway, and to fill solid in Stage Harbor, Chatham. Granted April 4, 1916.

4048. Petition of Joseph P. Silva, 2d, for license to build a pile wharf in Provincetown Harbor, Provincetown. Granted April 4, 1916.

4049. Petition of the Seaside Realty Company for license to drive piles for support of a building in tidewater at Salisbury Beach, Salisbury. Granted April 4, 1916.

4050. Petition of the Dartmouth Manufacturing Corporation for license to construct a crib, lay a 36-inch cast-iron pipe, build a pile and timber bulkhead strengthened by stone rip-rap, and to fill solid on Acushnet River, New Bedford. Granted April 18, 1916.

4051. Petition of the Silver Shellfish Company, Manuel F. Silva and Minnie E. Silva, for license to build a pile pier and pile jetty in Buzzards Bay near Winsagansett Creek, Fairhaven. Granted April 18, 1916.

4052. Petition of Manuel F. Silva and Minnie E. Silva for license to build a dam across the entrance to Winsagansett Creek in Buzzards Bay, Fairhaven. Granted April 18, 1916.

4053. Petition of the New England Cotton Yarn Company for license to build a pile and timber addition to its present salt-water intake, and to dredge in Acushnet River, New Bedford. Granted April 18, 1916.

Nos.

4054. Petition of the Turners Falls Power and Electric Company for license to lay eight cables over and across Connecticut River in Hadley and Easthampton. Granted May 3, 1916.

4055. Petition of William C. Almy for license to repair his wharf on Westport River, Westport. Granted May 3, 1916.

4056. Petition of Salem Rebuilding Commission for license to build a retaining wall on South River, Salem. Granted May 3, 1916.

4057. Petition of the William H. Hart Realty Company for license to build jetties and dam and to excavate a channel connecting Nantucket Sound and Farm Pond, and to dredge in the town of Oak Bluffs. Granted May 10, 1916.

4058. Petition of the Union Street Railway Company for license to build a pier on piles in Buzzards Bay, Fairhaven. Granted May 10, 1916.

4059. Petition of Elizabeth R. Holmes for license to build a sea wall and pile wharf, fill solid and dredge on Acushnet River, New Bedford. Granted May 16, 1916.

4060. Petition of Digo DeSouza for license to extend his wharf on piles in Provincetown Harbor, Provincetown. Granted May 26, 1916.

4061. Petition of Ellis D. Atwood and Lydia C. Atwood for license to excavate canal, build flume and pump-well and a concrete wall in and near Sampsons Pond, Carver, and to draw water from said pond for the purpose of flowing cranberry bogs in said town. Granted May 26, 1916.

4062. Petition of William E. W. Vaughan and the estate of Webster E. Vaughan of Carver; W. E. H. Vaughan and Merton F. Dorr of Whitman; and Mary A. Avery of Plymouth, for license to excavate a canal, build a flume and pump-well and a concrete wall in and near Wenham Pond, Carver, and to draw water from said pond. Granted May 26, 1916.

4063. Petition of Leon F. Foisy for license to build a pile platform and to locate a float and runway on South River, Salem. Granted May 26, 1916.

4064. Petition of the Manomet Mills for license to build a crib and lay an intake pipe in Acushnet River, New Bedford. Granted May 26, 1916.

4065. Petition of the Manomet Mills for license to build a rubble stone retaining wall and fill solid on Acushnet River, New Bedford. Granted May 26, 1916.

4066. Petition of the Chatham Freezer Company for license to build a pile pier and a conveyor in Stage Harbor, Chatham. Granted May 26, 1916.

4067. Petition of the Wianno Club for license to build a pile pier and to dredge in Nantucket Sound at Osterville, Barnstable. Granted June 1, 1916.

Nos.

4068. Petition of the town of Marblehead for license to locate and maintain a float in Marblehead Harbor, Marblehead. Granted June 1, 1916.

4069. Petition of Ethan Allen for license to locate a float and part of a runway in and over Great Pond, North Andover. Granted June 1, 1916.

4070. Petition of Samuel Small for license to excavate canals and ditches, maintain a pumping plant and draw water from the brook connecting Long Pond and Hinckley's Pond or Pleasant Lake, and from said Hinckley's Pond or Pleasant Lake, for flowing cranberry bogs in Harwich and Brewster. Granted June 1, 1916.

4071. Petition of the New Bedford Gas and Edison Light Company for approval of plans for laying and maintaining cables for transmission of electricity under the tidewaters of Acushnet River between New Bedford and Fairhaven, as authorized by chapter 30 of the Special Acts of 1915. Granted June 1, 1916.

4072. Petition of the city of Lowell for license to build a reinforced concrete bridge across Merrimac River at the site of the Pawtucket Bridge, Lowell. Granted June 7, 1916.

4073. Petition of Patrick H. Cahoon for license to build and maintain an inlet and an outlet sluiceway and a pump house for the purpose of drawing water from Hinckley's Pond, Harwich, for flowing a cranberry bog. Granted June 14, 1916.

4074. Petition of the Southern Massachusetts Telephone Company for license to lay and maintain a submarine cable in and under the waters of Muskeget Channel and the Atlantic Ocean from Marthas Vineyard to Nantucket. Granted June 14, 1916.

4075. Petition of Philip Y. DeNormandie for license to build a pile pier and float stage in Red Brook Harbor at Cataumet, Bourne. Granted June 20, 1916.

4076. Petition of the Winthrop Highlands Yacht Club for license to build a pile pier and float stage in Massachusetts Bay, Winthrop. Granted June 29, 1916.

4077. Petition of the William H. Hart Realty Company for license to build jetties and dam and excavate channel connecting Nantucket Sound and Farm Pond, and to dredge, in Oak Bluffs. Granted June 29, 1916.

4078. Petition of county commissioners of Essex County for approval of plans for reconstructing Essex bridge over Danvers River, Salem and Beverly, as authorized by chapter 132 of the General Acts of 1916. Granted June 29, 1916.

4079. Petition of the Plymouth Cordage Company for license to build and maintain structures and to excavate in Plymouth Harbor, Plymouth. Granted June 29, 1916.

4080. Petition of the Salem Rebuilding Commission for license to fill solid in Palmers Cove, Salem. Granted June 29, 1916.

Nos.

4081. Petition of the Old Colony Railroad Company for license to fill solid in Fall River Harbor, adjoining its Globe Freight Yard, so called, Fall River. Granted Aug. 1, 1916.

4082. Petition of the city of New Bedford for license to construct a concrete outfall sewer in New Bedford Harbor at Cove Street, New Bedford. Granted Aug. 2, 1916.

4083. Petition of the county commissioners of Essex County for approval of plans for reconstructing Essex Bridge across Danvers River, Salem and Beverly, as authorized by chapter 132 of the General Acts of 1916. Granted Aug. 2, 1916.

4084. Petition of the city of Beverly for license to locate and maintain a float for a public landing on Bass River at the bridge on Bridge Street, Beverly. Granted Aug. 2, 1916.

4085. Petition of George E. Williams and George G. Clark for license to build a pile pier adjoining Rams Horn Island in Lake Quinsigamond, Worcester. Granted Aug. 2, 1916.

4086. Petition of Elizabeth S. Ballou for license to build a boat landing in Lake Quinsigamond, Shrewsbury. Granted Aug. 2, 1916.

4087. Petition of the city of Lowell for license in substitution of license No. 4072, granted said city for building a reinforced concrete bridge across Merrimac River at site of present bridge, known as Pawtucket Bridge, Lowell. Granted Aug. 2, 1916.

LICENSES GRANTED BY THE DIRECTORS OF THE PORT OF BOSTON FROM DEC. 1, 1915, TO AUG. 3, 1916.

Nos.

163. Petition of the Lehigh & Wilkes-Barre Coal Company for license to construct a sea wall and fill dock in Mystic River, in Boston. Granted Dec. 29, 1915.

164. Petition of the Edison Electric Illuminating Company of Boston for license to lay and maintain a submarine conduit, with wires and cables to be placed therein, under Fort Point Channel, in Boston. Granted Dec. 27, 1915.

165. Petition of the Edison Electric Illuminating Company of Boston for license to lay and maintain a submarine conduit, with wires and cables to be placed therein, under the Reserved Channel, in Boston. Granted Dec. 27, 1915.

166. Petition of the Revere Rubber Company for license to fill in Chelsea River, in Chelsea. Granted Jan. 10, 1916.

167. Petition of the New York, New Haven & Hartford Railroad Company for license to make repairs to bulkhead, in Boston. Granted Jan. 10, 1916.

168. Petition of the estate of John F. Randall for license to construct and maintain an extension of wharf on Border Street, and to dredge to a depth of 26 feet at mean low water, at East Boston. Granted March 16, 1916.

Nos.

169. Petition of the New York, New Haven & Hartford Railroad Company for license to make repairs to bulkhead at the south end of dock No. 4, at the Boston Freight Terminal, in Boston. Granted Feb. 3, 1916.

170. Petition of the Federal Wharf and Storage Company for license to build a temporary wharf off Border Street, at East Boston. Granted Feb. 8, 1916.

171. Petition of the Standard Oil Company of New York for license to build a masonry sea wall, timber bulkhead and to fill solid on Chelsea Creek, at East Boston. Granted Feb. 15, 1916.

172. Petition of the Railroad Wharf and Storage Company for license to build two pile wharves and to dredge on Mystic River, in Boston. Granted Feb. 23, 1916.

173. Petition of Batchelder Brothers for license to build a bulkhead to replace an old structure on Roxbury Canal, in Boston. Granted March 10, 1916.

174. Petition of the Standard Oil Company of New York for license to dredge in Chelsea Creek in front of masonry sea wall to be constructed under license No. 171, at East Boston. Granted March 23, 1916.

175. Petition of the Sturtevant Wharf and Storage Company for license to extend its wharf on piles in Boston Harbor, at East Boston. Granted March 28, 1916.

176. Petition of the West End Street Railway Company, by the Boston Elevated Railway Company, for license to do certain filling in Mystic River, in Boston. Granted March 28, 1916.

177. Petition of the Charlestown Gas and Electric Company for license to build a timber bulkhead, fill solid, excavate and refill in Mystic River, in Boston. Granted March 28, 1916.

178. Petition of the Walworth Manufacturing Company for license to build a wharf on the southerly side of the Reserved Channel, at South Boston. Granted March 28, 1916.

179. Petition of the Fitchburg Railroad Company for license to build foundations for gantry crane on Charles River, at Charlestown. Granted April 11, 1916.

180. Petition of the Fore River Shipbuilding Corporation for license to construct two piers in Bents Creek in Weymouth Fore River, in Quincy. Granted April 11, 1916.

181. Petition of the West End Street Railway Company, by the Boston Elevated Railway Company, for license to fill solid between Eagle Street and Chelsea Creek, in East Boston. Granted April 12, 1916.

182. Petition of the city of Boston, by its commissioner of public works, for approval of plans for the construction of a high-pressure fire pumping station between Cambridge bridge and the Charles River Dam, in Boston. Granted April 24, 1916.

Nos.

183. Petition of the trustees of the T Wharf Land Trust for license to build walls and wharf, fill solid and to dredge in Boston Harbor, in Boston. Granted April 25, 1916.

184. Petition of the city of Boston, by its commissioner of public works, for license to build a retaining wall and to fill solid in the construction of Condor Street in Chelsea Creek, in Boston. Granted May 1, 1916.

185. Petition of the Metropolitan Park Commission for approval of plans for the construction of a permanent and temporary bridge in and over Neponset River, in Boston and Quincy. Granted May 2, 1916.

186. Petition of the New York, New Haven & Hartford Railroad Company for license to construct a temporary structure for strengthening its bridge over Neponset River near the Milton station, in Milton. Granted May 6, 1916.

187. Petition of the Proprietors of Long Wharf for license to build walls and wharves, fill solid and to dredge in Boston Harbor, in Boston. Granted May 6, 1916.

188. Petition of the Boston Wharf Company for approval of plans for the filling in of land on Fort Point Channel, in Boston. Granted May 10, 1916.

189. Petition of the city of Boston, by its board of park and recreation commissioners, for license to dredge and fill in Dorchester Bay, in Boston. Granted May 10, 1916.

190. Petition of the Cottage Park Yacht Club for license to build a foundation for addition to its present clubhouse in Boston Harbor, in Winthrop. Granted May 10, 1916.

192. Petition of the New York, New Haven & Hartford Railroad Company for license to fill solid in South Bay, in Boston. Granted May 15, 1916.

193. Petition of the trustees of the Alger Land Trust for license to fill solid in South Bay, in Boston. Granted May 15, 1916.

194. Petition of Charles E. Baker for license to excavate sand and gravel in Town River and Weymouth Fore River, in Quincy. Granted May 22, 1916.

195. Petition of the Fore River Shipbuilding Corporation for license to construct a movable span between piers authorized by license No. 180, and to construct a pile trestle across Bents Creek in Weymouth Fore River, in Quincy. Granted May 29, 1916.

196. Petition of the New England Gas and Coke Company for license to repair the south section of its wharf on Mystic River, in Everett. Granted May 29, 1916.

197. Petition of the West End Street Railway Company, by the Boston Elevated Railway Company, for license to fill solid in Boston Harbor south of Neponset Avenue on the westerly side of Neponset River, in Boston. Granted June 6, 1916.

Nos.

198. Petition of the Cambridge Gas Light Company for license to remove and replace fender piles on the northerly side of Broad Canal, in Cambridge. Granted June 12, 1916.

199. Petition of the Moody Land Company for license to build a runway and wharf on the easterly side of Weymouth Fore River, in Weymouth. Granted June 12, 1916.

200. Petition of the Boston Storage Company for license to drive piles and reinforce an existing pier in Boston Harbor, at East Boston. Granted June 12, 1916.

201. Petition of the Central Square Wharf Company for license to dredge a dock and build a pile wharf in Boston Harbor, at East Boston. Granted June 27, 1916.

202. Petition of the Thomas Cavanagh Company for license to dredge, build timber bulkheads and fill solid in Old Harbor, in Boston. Granted June 27, 1916.

203. Petition of the Mexican Petroleum Corporation for license to construct a pile trestle to carry oil pipes, at the head of Bass Creek, in Chelsea. Granted June 28, 1916.

204. Petition of the Revere Sugar Refinery for license to dredge an area on the southerly side of Mystic River, in Boston. Granted July 8, 1916.

205. Petition of the city of Boston, by its park and recreation commissioners, for license to fill solid and to dredge in Dorchester Bay, between Savin Hill and Commercial Point, in Boston. Granted July 8, 1916.

207. Petition of the Fore River Shipbuilding Corporation for license to fill solid two areas in Bents Creek, in Quincy. Granted July 8, 1916.

208. Petition of the city of Boston, by its commissioner of public works, for license to lay and maintain a 6-inch flexible jointed water pipe, connecting Long and Spectacle Islands in Boston Harbor, in Boston. Granted July 8, 1916.

209. Petition of the Revere Sugar Refinery for license to build a sea wall and bulkhead on Mystic River, in Boston. Granted July 25, 1916.

210. Petition of the city of Boston, by its fire commissioner, for license to refit one pile and install new piles in Charles River near North End Park, in Boston. Granted Aug. 1, 1916.

211. Petition of the New York, New Haven & Hartford Railroad Company for license to fill solid in South Bay, in Boston. Granted Aug. 1, 1916.

212. Petition of the Mexican Petroleum Corporation for license to construct piers, bulkhead, dolphins, tie piles and to fill solid in Chelsea River, in Chelsea. Granted Aug. 1, 1916.

213. Petition of the New England Telephone and Telegraph Company for license to install and maintain three temporary submarine cables under Mystic River, in Boston. Granted Aug. 1, 1916.

Nos.

214. Petition of Tarrant P. King, Caroline W. King and Anne P. King, trustees, for license to construct a timber bulkhead and to fill solid on the southerly side of the Reserved Channel, at South Boston. Granted Aug. 1, 1916.

215. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to widen and repair a wharf on the southerly side of Point Shirley, in Winthrop. Granted Aug. 3, 1916.

LICENSES GRANTED BY THE COMMISSION ON WATERWAYS AND PUBLIC LANDS FROM AUG. 3, 1916, TO NOV. 30, 1916.

Nos.

1. Petition of the Palmer & Parker Company for license to build a pile wharf, a pile and timber structure, and to dredge in the south channel of Mystic River, in Boston. Granted Aug. 29, 1916.
2. Petition of the Bay State Street Railway Company for license to lay and maintain five cables in and under Bass River at the draw-way in bridge on Bridge Street across said river, in Beverly. Granted Aug. 29, 1916.
3. Petition of the Pico Cranberry Company for license to excavate a ditch and draw water from Long Pond for the purpose of flowing a cranberry bog in the town of Brewster. Granted Aug. 29, 1916.
4. Petition of Charles E. Hall and Freeman B. Hall for license to build a pile and timber bulkhead and to fill solid in Eel Pond at Woods Hole, in Falmouth. Granted Aug. 29, 1916.
5. Petition of E. C. Cornwell for license to build and maintain a pile pier in Lake Anthony, in Oak Bluffs. Granted Aug. 29, 1916.
6. Petition of the Fore River Shipbuilding Corporation for license to construct pile dolphins and a log boom on Weymouth Fore River, in Quincy. Granted Sept. 1, 1916.
7. Petition of the Edison Electric Illuminating Company of Boston for license to lay and maintain four cables at L Street bridge on the Reserved Channel, in Boston. Granted Sept. 1, 1916.
8. Petition of the city of Gloucester for license to build a sea wall, to fill solid and to locate and maintain a float stage in Gloucester Harbor, in Gloucester. Granted Sept. 1, 1916.
9. Petition of the Bay State Street Railway Company for license to lay and maintain seven cables in and under Annisquam River, otherwise known as the Gloucester Canal, at Cut bridge, in Gloucester. Granted Sept. 12, 1916.
10. Petition of the Cambridge Gas Light Company for license to rebuild a portion of a sea wall and to drive fender piles on Broad Canal, in Cambridge. Granted Sept. 12, 1916.
11. Petition of the Acushnet Mills Corporation for license to build a bulkhead, place rip-rap, fill solid, lay pipes and construct cribs on Acushnet River, in New Bedford. Granted Sept. 21, 1916.

Nos.

12. Petition of H. L. Taylor & Co. for license to extend a wharf on Merrimac River, in Haverhill. Granted Sept. 20, 1916.
13. Petition of the Newburyport Gas and Electric Company for license to lay and maintain a submarine cable in and under Merrimac River, in Newburyport and Salisbury. Granted Sept. 26, 1916.
14. Petition of the Bay State Street Railway Company for license to maintain eight cables now laid and to lay two additional cables in and under Weymouth Back River at Back River Bridge, in Weymouth and Hingham. Granted Oct. 6, 1916.
15. Petition of the Holyoke Canoe Club for license to relocate and maintain its floats on Connecticut River, in Holyoke. Granted Oct. 6, 1916.
16. Petition of the town of Agawam for license to construct and maintain a sewer outlet in Connecticut River at the southeasterly end of Leonard Street, in Agawam. Granted Oct. 6, 1916.
17. Petition of Arthur J. Lacey for license to build and maintain a marine railway in Plymouth Harbor, in Plymouth. Granted Oct. 6, 1916.
18. Petition of the Gloucester Coal Company for license to build a bulkhead, drive fender piles and fill solid in a dock in Gloucester Harbor, in Gloucester. Granted Oct. 13, 1916.
19. Petition of Grace L. Bray and others for license to build a bulkhead and fill solid in a dock in Gloucester Harbor, in Gloucester. Granted Oct. 13, 1916.
20. Petition of the North Shore Realty Trust for license to build a concrete wall, a pile platform and to fill solid in Vincent Cove, in Gloucester. Granted Oct. 13, 1916.
21. Petition of the Old Colony Railroad Company for license to widen its existing bridge across Duck Creek, to build a pile platform and to fill solid in Wellfleet Harbor, in Wellfleet. Granted Oct. 19, 1916.
22. Petition of the George Lawley & Son Corporation for license to build pile structures, fill solid and to dredge in Neponset River, in Boston. Granted Oct. 19, 1916.
23. Petition of the Whitman Mills for license to build a wall and fill solid on Acushnet River, in New Bedford. Granted Nov. 1, 1916.
24. Petition of the General Electric Company for license to reinforce its present wharf on Saugus River, in Lynn. Granted Nov. 1, 1916.
25. Petition of William A. Hopkins for license to build a boathouse and marine railway on Saugus River, in Lynn. Granted Nov. 6, 1916.
26. Petition of the Boston Elevated Railway Company for license to dump snow and ice into tidewaters. Granted Nov. 6, 1916.
27. Petition of the Nantasket Beach Steamboat Company for license to construct and maintain a pile dolphin in Hingham Bay, in Hull. Granted Nov. 6, 1916.
28. Petition of the city of Boston for approval of plans for the improvement of Old Harbor, in Boston. Granted Nov. 21, 1916.

Nos.

29. Petition of the city of Boston, by its commissioner of public works, for license to dump snow and ice into tidewaters. Granted Nov. 24, 1916.
30. Petition of the Merrimac Valley Power and Buildings Company for license to build and maintain a bridge with a draw therein across Powow River, in Amesbury. Granted Nov. 28, 1916.
31. Petition of the Canal Fish and Freezing Company for license to build a bulkhead and pile and timber wharf, to construct dolphins and mooring caps, to fill solid and to dredge in and near the Cape Cod Canal, in Sandwich. Granted Nov. 28, 1916.
32. Petition of the Warren Brothers Company for license to reconstruct a wall on Broad Canal, in Cambridge. Granted Nov. 28, 1916.

Miscellaneous Permits granted and Fish Weir Permits approved by the Board of Harbor and Land Commissioners from Dec. 1, 1915, to Aug. 3, 1916.

Pocahontas Fuel Company, to dredge berth in Acushnet River, New Bedford. Granted Dec. 9, 1915.

John H. Donahue, to set two traps for fishing in Taunton River, Dighton. Approval of permit issued Oct. 11, 1915, by selectmen of Dighton. Granted Dec. 14, 1915.

Naylor Hatch, to construct and maintain eel fykes in Pamet River, Truro. Approval of permits issued Sept. 16, 1915, and Nov. 9, 1915, by selectmen of Truro. Granted Dec. 14, 1915.

Edward G. Howes, to construct and maintain a fish weir in Chatham South Bay, Chatham. Approval of permit issued Dec. 7, 1915, by selectmen of Chatham. Granted Dec. 14, 1915.

Charles W. Snow, to construct and maintain eel fykes in Pamet River, Truro. Approval of permits issued Aug. 14, 1915, and Oct. 13, 1915, by selectmen of Truro. Granted Dec. 14, 1915.

Boston, Cape Cod & New York Canal Company, for extension of time to Jan. 31, 1916, for use of dumping ground in Buzzards Bay between Abiel's Ledge and Dry Ledge, under permit granted Jan. 3, 1912. Granted Dec. 15, 1915.

Charles E. F. Benson, to set and maintain a fish trap in the waters of Lagoon Pond, Tisbury. Approval of permit issued Oct. 16, 1915, by selectmen of Tisbury. Granted Dec. 21, 1915.

David Butler and James A. Mayhew, to construct and maintain a fish weir in Menamsha Pond, Chilmark. Approval of permit issued Jan. 1, 1916, by selectmen of Chilmark. Granted Jan. 11, 1916.

James R. Baker and Robert Clark, to construct and maintain a fish weir in the waters of the south shore of Yarmouth. Approval of permit issued Dec. 31, 1915, by selectmen of Yarmouth. Granted Jan. 25, 1916.

BAY STATE FREEZER, INC., to construct and maintain two fish weirs in the waters of the north shore of Yarmouth. Approval of permit issued Dec. 30, 1915, by selectmen of Yarmouth. Granted Jan. 25, 1916.

WILLIAM H. NEWELL, to construct and maintain a fish weir in the waters of the north shore of Yarmouth. Approval of permit issued Dec. 31, 1915, by selectmen of Yarmouth. Granted Jan. 25, 1916.

WILLIAM M. STONE, to construct a fish weir in Barnstable Bay, Dennis. Approval of permit issued Dec. 28, 1915, by selectmen of Dennis. Granted Jan. 25, 1916.

THE SPRAGUE, BREED & BROWN COMPANY, to redredge berth at its wharf in Beverly Harbor, Beverly. Granted Jan. 25, 1916.

FREDERICK T. LANE, to construct a fish trap in the waters of Rockport. Approval of permit issued Nov. 18, 1915, by selectmen of Rockport. Granted Feb. 1, 1916.

JOHN F. RANDOLPH, to set a fish trap in Lagoon Pond, Oak Bluffs. Approval of permit issued Dec. 17, 1915, by selectmen of Oak Bluffs. Granted Feb. 1, 1916.

EDMUND D. and EDMUND S. KENDRICK, to construct and maintain a fish weir in Pleasant Bay, Chatham. Approval of permit issued Feb. 2, 1916, by selectmen of Chatham. Granted Feb. 8, 1916.

NILES NELSON, to construct three fish weirs in the waters of Brewster. Approval of permit issued Feb. 5, 1916, by selectmen of Brewster. Granted Feb. 15, 1916.

EDGAR F. WIXON, to construct and maintain a fish weir in tidewaters of Dennis. Approval of permit issued Feb. 2, 1916, by selectmen of Dennis. Granted Feb 15, 1916.

JOSEPH LONG, to erect and maintain a fish weir in tidewaters of Dennis. Approval of permit issued Feb. 11, 1916, by selectmen of Dennis. Granted Feb. 16, 1916.

ALBERT H. NICKERSON, to construct and maintain a fish weir in tidewaters of Eastham. Approval of permit issued Jan. 29, 1916, by selectmen of Eastham. Granted Feb. 16, 1916.

ZENAS H. BAKER, to construct and maintain a fish weir in tidewaters of Vineyard Sound, Dennis. Approval of permit issued December, 1915, by selectmen of Dennis. Granted Feb. 24, 1916.

GEORGE W. BLOOMER, to construct and maintain a fish weir on outside of Monomoy Beach, Chatham. Approval of permit issued Feb. 21, 1916, by selectmen of Chatham. Granted Feb. 24, 1916.

OSCAR C. DAVIS, to remove material from beach at Sias Point, East Wareham. Granted Feb. 24, 1916.

BENJAMIN F. RICH, to construct and maintain a fish weir in Bassing Harbor, Chatham. Approval of permit issued Febi 21, 1916, by selectmen of Chatham. Granted Feb. 24, 1916.

CHARLES F. LANCASTER and ALDEN A. MILLS, trustees of the Point of Pines Trust, to dredge in Pines River. Granted Feb. 24, 1916.

BENJAMIN KENDRICK, to set and maintain a fish weir in South Bay, Harwich. Approval of permit issued March 1, 1916, by selectmen of Harwich. Granted March 8, 1916.

ALONZO KENDRICK, to set and maintain a fish weir in South Bay, Harwich. Approval of permit issued March 1, 1916, by selectmen of Harwich. Granted March 8, 1916.

RUBEN D. KENDRICK, to set and maintain a fish weir in South Bay, Harwich. Approval of permit issued March 1, 1916, by selectmen of Harwich. Granted March 8, 1916.

FRED W. BAKER, to construct and maintain a fish weir in tidewaters of Chatham. Approval of permit issued March 6, 1916, by selectmen of Chatham. Granted March 8, 1916.

FRED D. GAGE, to construct and maintain a fish weir in Barnstable Bay, Dennis. Approval of permit issued Feb. 29, 1916, by selectmen of Dennis. Granted March 8, 1916.

CHARLES GARDNER, to set fish traps in Taunton River, Dighton. Approval of permit issued March 1, 1916, by selectmen of Dighton. Granted March 8, 1916.

CHARLES B. LONG, to erect and maintain a fish weir in tidewaters of Dennis. Approval of permit issued Feb. 28, 1916, by selectmen of Dennis. Granted March 8, 1916.

WARREN W. SMALL, for the NATIONAL WEIR COMPANY, to construct and maintain a fish weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted March 8, 1916.

CHARLES W. SNOW, for the PAMET HARBOR WEIR COMPANY, to construct and maintain a fish weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted March 8, 1916.

MYRON H. VINCENT and DANIEL C. LOOK, under name of VINCENT & LOOK, to construct and maintain a fish weir in Vineyard Sound, Chilmark. Approval of permit issued Feb. 24, 1916, by selectmen of Chilmark. Granted March 8, 1916.

DANIEL W. WEST, to construct and maintain a fish weir in Vineyard Sound, Chilmark. Approval of permit issued Feb. 24, 1916, by selectmen of Chilmark. Granted March 8, 1916.

THE NASHAWENA MILLS, to dredge in Acushnet River, New Bedford. Granted March 14, 1916.

CHARLES W. SNOW, for the HARBOR BAR FISH WEIR COMPANY, to construct and maintain a fish weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted March 14, 1916.

ALLEN A. and ERNEST L. FLANDERS, to construct and maintain a fish weir in Vineyard Sound, Chilmark. Approval of permit issued Feb. 24, 1916, by selectmen of Chilmark. Granted March 21, 1916.

CHARLES R. RICHARDSON, to erect and maintain a flounder trap in Town Cove, near and on southerly side of Hopkins Island, Orleans. Approval of permit issued March 1, 1916, by selectmen of Orleans. Granted March 21, 1916.

WALTER F. CHACE, to dredge in Fairhaven Harbor or Acushnet River, Fairhaven. Granted March 28, 1916.

JOHN T. MCARDLE, to construct and operate a fish weir or weirs in Cape Cod Bay, Sandwich. Approval of permit issued March 11, 1916, by selectmen of Sandwich. Granted March 28, 1916.

DONALD R. CAMPBELL, to construct and maintain a fish weir in Vineyard Sound, Chilmark. Approval of permit issued March 9, 1916, by selectmen of Chilmark. Granted March 28, 1916.

EDY C. FLANDERS & Co., to construct and maintain a fish weir in Vineyard Sound, Gay Head. Approval of permit issued March 16, 1916, by selectmen of Gay Head. Granted March 28, 1916.

FRANK H. GRANT, to set fish traps and pots in Taunton River and Segregansett River, Dighton. Approval of permit issued March 15, 1916, by selectmen of Dighton. Granted March 28, 1916.

WELCOME L. TILTON, to construct and maintain a fish weir in Vineyard Sound, Chilmark. Approval of permit issued March 9, 1916, by selectmen of Chilmark. Granted March 28, 1916.

CLARINGTON K. TUSPRI and JOSEPH L. ELLIS, to set and maintain a fish weir in South Bay, Harwich. Approval of permit issued March 1, 1916, by selectmen of Harwich. Granted March 28, 1916.

BENJAMIN L. JONES, to construct and maintain a fish weir in Chatham South Bay, Chatham. Approval of permit issued March 20, 1916, by selectmen of Chatham. Granted April 4, 1916.

ROLAND C. NICKERSON, to construct four fish weirs in tidewaters of Brewster. Approval of permit issued March 25, 1916, by selectmen of Brewster. Granted April 4, 1916.

FRED C. RICH, for the EAST HARBOR WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

FRED C. RICH, for the GREAT SWAMP WEIR COMPANY, to construct and maintain a deep-water weir in the tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

FRED C. RICH, for the NORTHWESTERN WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

FRED C. RICH, for the NUMBER ONE WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

FRED C. RICH, for the NUMBER TWO WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

FRED C. RICH, for the POND VILLAGE WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

RICHARD A. RICH, for the R. A. RICH COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

EDWARD N. RYDER, for the SOUTH TRURO WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 4, 1916.

ISAAC C. FREEMAN, for the SOUTHWESTERN WEIR COMPANY, to construct and maintain a deep-water weir in tidewaters of Truro. Approval of permit issued Jan. 1, 1916, by selectmen of Truro. Granted April 11, 1916

OBED S. DAGGETT, to construct and maintain a fish weir in the waters of Gosnold, from the shore of Naushon Island at a point called the "Black Woods," situated about 1½ miles west of Tarpaulin Cove Lighthouse. Approval of renewal, dated April 8, 1916, of permit issued April 20, 1915, by selectmen of Gosnold. Granted April 26, 1916.

OBED S. DAGGETT, to construct and maintain a fish weir in waters of Gosnold, from the shore of Naushon Island at a point called the "French Watering Place," situated about 1 mile west of Tarpaulin Cove Lighthouse. Approval of renewal, dated April 8, 1916, of permit issued April 20, 1915, by selectmen of Gosnold. Granted April 26, 1916.

MARINE BIOLOGICAL LABORATORY, to construct and maintain a fish trap in tidewaters of Gosnold. Approval of permit issued April 1, 1916, by selectmen of Gosnold. Granted April 26, 1916.

SILAS AMIDON, to set fish traps and eel pots in Taunton River and its tributaries, Dighton. Approval of permit issued April 14, 1916, by selectmen of Dighton. Granted May 3, 1916.

JOSEPH G. DOUGLASS, to place a floating trap in Gloucester Harbor inside Dog Bar Breakwater, Eastern Point. Approval of permit issued April 11, 1916, by municipal council of Gloucester. Granted May 3, 1916.

GEORGE F. JOHNSON, to construct and maintain a fish trap in tidewaters of Provincetown. Approval of permit issued March 25, 1916, by selectmen of Provincetown. Granted May 3, 1916.

JOHN A. MATHESON, agent, to construct and maintain a fish trap in tidewaters of Provincetown. Approval of permit issued Jan. 18, 1916, by selectmen of Provincetown. Granted May 3, 1916.

JOHN J. O'NEILL, to construct and maintain two fish traps in tidewaters of Provincetown. Approval of permit issued May 1, 1914, by selectmen of Provincetown. Granted May 3, 1916.

JOSHUA PAINE, to construct and maintain three fish weirs in tidewaters of Provincetown. Approval of permits issued Jan. 8, 1916, by selectmen of Provincetown. Granted May 3, 1916.

WILLIAM SLOAN, Jr., to place a floating trap in Gloucester Harbor off Dolliver's Neck, Gloucester. Approval of permit issued April 18, 1916, by municipal council of Gloucester. Granted May 3, 1916.

CARL N. TARR, to place a floating trap in Brace's Cove at Eastern Point, Gloucester. Approval of permit issued April 4, 1916, by municipal council of Gloucester. Granted May 3, 1916.

W. H. Ellis & Son Company, extension to Sept. 1, 1916, of permit granted March 11, 1915, to dredge three areas in Apponagansett or Padanarum Harbor, Dartmouth. Granted May 9, 1916.

John A. Matheson, agent to construct and maintain a fish weir in tidewaters of Provincetown. Approval of permit issued May 1, 1914, by selectmen of Provincetown. Granted May 9, 1916.

Edward P. Cook, to construct and maintain a fish weir in tidewaters of Wellfleet. Approval of permit issued April 29, 1916, by selectmen of Wellfleet. Granted May 25, 1916.

Hiram N. Luce, to maintain and operate a fish weir in Vineyard Sound, West Tisbury. Approval of permit issued May 8, 1916, by selectmen of West Tisbury. Granted May 25, 1916.

City of Lawrence, by its Lawrence Bridge Commission, to construct a temporary unreinforced concrete arch in Central bridge over proposed future channel in Merrimac River, Lawrence. Granted June 1, 1916.

James L. Johnston, Lawrence H. Sullivan and Harry D. Delano, to construct concrete capping on top of that part of sea wall built by the Commonwealth on the shore of Green Hill, Hull, on or in front of the premises of said Johnston, Sullivan and Delano. Granted June 14, 1916.

Amos T. Smalley, to construct and maintain a fish weir in Vineyard Sound. Approval of permit issued May 16, 1916, by selectmen of Gay Head. Granted June 14, 1916.

Sylvester M. Hanson, to construct and maintain a fish weir on the southeasterly side of Browns Island, Plymouth. Approval of permit issued June 1, 1916, by selectmen of Plymouth. Granted June 14, 1916.

Ernest L. Sampson, to remove sand, gravel and stone from beach at Ellisville, Plymouth. Granted June 14, 1916.

James W. Marchant, to set and maintain a fishing trap in tidewaters of Gloucester. Approval of permit issued June 22, 1916, by municipal council of Gloucester. Granted July 5, 1916.

Edward Holway, to set and maintain a fish weir in Cape Cod Bay, Bourne. Approval of permit issued March 22, 1916, by selectmen of Bourne. Granted July 19, 1916.

Canal Fish and Freezing Company, to construct and operate a fish weir or weirs in Cape Cod Bay, Sandwich. Approval of permit issued June 24, 1916, by selectmen of Sandwich. Granted July 19, 1916.

Isaac E. Chase, to construct a fish weir in tidewaters of Orleans. Approval of permit issued July 15, 1916, by selectmen of Orleans. Granted July 26, 1916.

Old Colony Gun Club, to occupy Gull Island in Snipatuit Lake, Rochester. Granted July 24, 1916.

Gloucester Salt Fish Company, to set a pole fishing trap off Brier Neck, Gloucester. Approval of permit issued May 9, 1916, by municipal council, Gloucester. Granted Aug. 3, 1916.

The Quissett Mill, to dredge in Acushnet River, New Bedford, easterly of its bulkhead. Granted Aug. 3, 1916.

Miscellaneous Permits granted by the Directors of the Port of Boston from Dec. 1, 1915, to Aug. 3, 1916.

Morris & Cumings Dredging Company, to deposit upon an area northerly and easterly of Jeffries Point material dredged from within the area to be excavated for the dry dock at South Boston. Granted Dec. 6, 1915.

Morris & Cumings Dredging Company, to deposit in deep water, northwesterly of Governors Island, the balance of the material dredged from the channel to the Wollaston and Squantum Yacht Clubs, Quincy. Granted Dec. 6, 1915.

Boston Elevated Railway Company, to dredge to a depth of 29 feet at mean low water an area 60 by 500 feet in front of its wharf in South Boston. Granted Dec. 6, 1915.

Bay State Dredging and Contracting Company, to deposit upon an area northerly and westerly of Governors Island about 3,000 cubic yards of material dredged from Boston Harbor. Granted Dec. 6, 1915.

Bay State Dredging and Contracting Company, to deposit upon an area northerly and westerly of Governors Island about 10,000 cubic yards of material dredged from the dock of the Purity Distilling Company of Boston. Granted Dec. 7, 1915.

Edison Electric Illuminating Company of Boston, to remove 12 poles erected for the support of wires across the property of the Commonwealth at South Boston from the corner of B and Congress streets to Commonwealth Pier No. 5. Granted Dec. 10, 1915.

Bay State Dredging and Contracting Company, to deposit upon flats in Chelsea Creek, East Boston, about 250 cubic yards of material dredged in Weymouth Fore River for the Fore River Shipbuilding Corporation. Granted Dec. 10, 1915.

Holbrook, Cabot & Rollins Corporation, to receive, within the bulkheaded areas at the dry dock, South Boston, cinders, ashes and other suitable material as filling for the construction of a railroad and roadway. Granted Dec. 13, 1915.

Boston Sand and Gravel Company, to deposit at the receiving basin northwesterly of Governors Island about 400 tons of sand. Granted Dec. 14, 1915.

P. O'Riorden Dredging Company, to deposit upon an area northerly and westerly of Governors Island material contained in one scow loaded at the Appraisers' Stores, Boston. Granted Dec. 15, 1915.

Edison Electric Illuminating Company of Boston, to deposit on the lands of the Commonwealth at South Boston cinders, ashes and other material taken from boiler plants at its L Street and Atlantic Avenue stations. Granted Dec. 27, 1915.

Bay State Dredging and Contracting Company, to deposit upon an area northerly and westerly of Governors Island about 75,000 cubic yards of material dredged under private contracts. Granted Dec. 29, 1915.

C. H. Sprague & Son, to dredge to a depth of 24 feet at mean low water a berth 400 by 50 feet lying in front of the wharves known as Liverpool and Batchelder's Wharves on Fort Point Channel. Granted Jan. 4, 1916.

Morris & Cumings Dredging Company, to deposit and dump at or near East Boston not exceeding 700,000 cubic yards of material dredged at the site of the proposed dry dock in Boston Harbor. Granted Jan. 10, 1916.

Boston Development and Sanitary Company, to deposit upon an area northerly and westerly of Governors Island about 7,500 cubic yards of material obtained from the excavation of the Dorchester Tunnel. Granted Jan. 15, 1916.

James H. Ferguson, to use a lot of land on the southerly side of Fargo Street, South Boston, for storing building materials during the construction of sewer in Fargo Street between C and D streets. Granted Jan. 29, 1916.

Frederic D. Fisk and others, trustees, to dredge not exceeding 150,000 cubic yards of material from their flats in Charles River on the Cambridge side of the channel near Cambridge bridge. Granted Feb. 3, 1916.

Isaac Blair & Co., Incorporated, to dump clean snow into tidewater off Dover Street bridge in Boston. Granted Feb. 3, 1916.

Edison Electric Illuminating Company of Boston, to erect, maintain and use 11 poles for the support of electric wires across the property of the Commonwealth at South Boston. Granted Feb. 8, 1916.

New England Telephone & Telegraph Company, to erect, maintain and use 11 poles for the support of electric wires across the property of the Commonwealth at South Boston. Granted Feb. 8, 1916.

Metropolitan Coal Company, to dump ashes on the Commonwealth Flats at South Boston. Granted Feb. 10, 1916.

J. S. Packard Dredging Company, to deposit upon an area northerly and westerly of Governors Island about 20,000 cubic yards of material dredged from various parts of Boston Harbor. Granted Dec. 11, 1916.

City of Boston, by its public works department, to dump snow into tidewater from Northern Avenue in front of the buildings of the Boston Fish Market Corporation. Granted Feb. 17, 1916.

Morris & Cumings Dredging Company, to deposit upon an area northerly and westerly of Governors Island about 50,000 cubic yards of material dredged in Chelsea Creek. Granted Feb. 18, 1916.

Edison Electric Illuminating Company of Boston, to construct and maintain one manhole with two fibre conduits on the property of the Commonwealth at South Boston. Granted Feb. 29, 1916.

J. S. Packard Dredging Company, to deposit upon an area northerly and westerly of Governors Island about 20,000 cubic yards of material dredged at the Charlestown Navy Yard and in various parts of Boston Harbor. Granted March 7, 1916.

P. Corcoran & Sons, Incorporated, to dump ashes on the Commonwealth Flats in the vicinity of Dry Dock Avenue at South Boston. Granted March 14, 1916.

Estate of John F. Randall, to dredge to a depth of 26 feet at mean low water an area in East Boston. Granted March 14, 1916.

Frank Rose, to use and occupy Quarantine Rock in Boston Harbor for one year. Granted March 16, 1916.

Joseph Gahm & Son Company, to dump ashes on the Commonwealth Flats at South Boston. Granted March 16, 1916.

New York, New Haven & Hartford Railroad Company, to redredge a berth along the easterly side of the coal unloading trestle at Pier No. 4, South Boston. Granted March 18, 1916.

Betts Brothers & Company, to deposit upon an area northerly and westerly of Governors Island ashes contained in one scow loaded from a ship at Commonwealth Pier No. 5. Granted March 24, 1916.

Hugh Nawn Contracting Company, to use a plot of Commonwealth land 50 by 100 feet on the southerly side of Summer Street. Granted March 28, 1916.

J. P. O'Riorden, to deposit upon an area northerly of Governors Island material in one scow loaded at the Atlas Stores, South Boston. Granted March 28, 1916.

P. O'Riorden Dredging Company, to deposit upon an area northerly of Governors Island 5,000 cubic yards of material obtained at the Atlas Stores, South Boston. Granted March 30, 1916.

P. O'Riorden Dredging Company, to deposit upon an area northerly of Governors Island 6,000 cubic yards of material dredged from various parts of Boston Harbor. Granted April 3, 1916.

C. H. Sprague & Son, to redredge to a depth of 25 feet at mean low water an area near the pier of the Edison Electric Illuminating Company of Boston, on the Reserved Channel at South Boston. Granted April 5, 1916.

Nantasket Beach Steamboat Company, to redredge the berths around its wharf at Nantasket Landing and on the southerly side of its wharf at Pemberton, Hull. Granted April 5, 1916.

Bay State Dredging and Contracting Company, to deposit upon an area northerly of Governors Island 50,000 cubic yards of material dredged from various parts of Boston Harbor. Granted April 7, 1916.

American Sugar Refining Company, to redredge to a depth of 18 feet at mean low water an area in front of its pier on Fort Point Channel. Granted April 10, 1916.

P. O'Riorden Dredging Company, to deposit upon an area northerly of Governors Island 10,000 cubic yards of material dredged from various parts of Boston Harbor. Granted April 10, 1916.

P. McGovern & Company, to remove a shoal caused by spill from a dumping chute on the northerly side of the Batchelder Coal Wharf, Fort Point Channel. Granted April 12, 1916.

Boston & Albany Railroad (New York Central Railroad Company, Lessee), to redredge to a depth of 34 feet at mean low water an area on the east side of dock No. 5, adjacent to the wharf of the Massachusetts Wharf Coal Company, East Boston. Granted April 14, 1916.

Staples Coal Company, to redredge to a depth of 15 feet at mean low water an area 275 by 50 feet on the east side of its dock at 498 Albany Street, Boston. Granted April 18, 1916.

Boston Development and Sanitary Company, to dredge areas to a depth of 10 and 12 feet at mean low water, respectively, in the entrance channel and in the basin in front of its property on Chelsea Creek, East Boston. Granted April 18, 1916.

Boston Dredging Company, to deposit upon an area northerly of Governors Island 50,000 cubic yards of material dredged from various parts of Boston Harbor. Granted April 21, 1916.

Nantasket Beach Steamboat Company, to remove the accumulation of sand in and around the northerly end of Pemberton Pier in Hull. Granted April 26, 1916.

P. O'Riorden Dredging Company, to deposit upon an area at Governors Island 25,000 cubic yards of material dredged from various parts of Boston Harbor. Granted May 1, 1916.

Holbrook, Cabot & Rollins Corporation, to receive at or near the site of the cofferdam at the dry dock 15,000 cubic yards, more or less, of material delivered by the Maryland Dredging and Contracting Company. Granted May 1, 1916.

Hugh Nawn Contracting Company, to deposit upon an area northerly of Governors Island 10,000 cubic yards of material dredged from Mystic River. Granted May 2, 1916.

Quincy Lumber Company, to dredge to a depth of 4 feet at mean low water the berth in front of its wharf on Town River, Quincy. Granted May 4, 1916.

Maryland Dredging and Contracting Company, to deposit at or near the site of the cofferdam at the dry dock 15,000 cubic yards, more or less, of material dredged from Mystic River. Granted May 6, 1916.

Boston & Maine Railroad, to redredge to a depth of 30 feet at mean low water docks 46 and 48 on Mystic River. Granted May 6, 1916.

National Dock and Storage Warehouse Company, to dredge the dock alongside of its north pier to a width of 50 feet and a depth of 30 feet at mean low water. Granted May 6, 1916.

Town of Milton, to dredge to a depth of 6 feet at mean low water an area opposite the public landing in Milton. Granted May 8, 1916.

Edison Electric Illuminating Company of Boston, to lay and maintain electric conduits and manholes beneath the surface of Fargo Street, between B and C streets and between D Street and Summer Street Extension, at South Boston. Granted May 8, 1916.

UNITED STATES COAST GUARD, to remove not more than 50 cubic yards of gravel and stone from the beach near Stony Beach Shore, Hull. Granted May 10, 1916.

WILLIAM R. FARRELL, to deposit upon an area northerly of Governors Island 1,500 cubic yards of material used as steamship ballast. Granted May 12, 1916.

EDISON ELECTRIC ILLUMINATING COMPANY OF BOSTON, to lay and maintain electric conduits and manholes beneath the surface of Harbor Street and of Dry Dock Avenue, South Boston. Granted May 15, 1916.

DAVID H. JACOBS & SON, INCORPORATED, to connect the Colonial Steel Company's warehouse with the new sewer recently constructed in Fargo Street, South Boston. Granted May 18, 1916.

MORRIS & CUMINGS DREDGING COMPANY, to extend area "B" under dumping permit granted Jan. 10, 1916. Granted May 20, 1916.

MARYLAND DREDGING AND CONTRACTING COMPANY, to deposit at or near the site of the cofferdam at the dry dock 10,000 cubic yards, more or less, of material dredged from Mystic River. Granted May 23, 1916.

HOLBROOK, CABOT & ROLLINS CORPORATION, to receive at or near the site of the cofferdam at the dry dock 10,000 cubic yards, more or less, of material delivered by the Maryland Dredging and Contracting Company. Granted May 23, 1916.

HOLBROOK, CABOT & ROLLINS CORPORATION, to receive at or near the site of the cofferdam at the dry dock 15,000 cubic yards, more or less, of material delivered by the Morris & Cumings Dredging Company. Granted May 23, 1916.

MORRIS & CUMINGS DREDGING COMPANY, to deposit at or near the site of the cofferdam at the dry dock 15,000 cubic yards, more or less, of material dredged at Wollaston Beach. Granted May 23, 1916.

CITY OF BOSTON, by its fire commissioner, to replace one oak fender in a pier at South Boston. Granted May 26, 1916.

BAY STATE DREDGING AND CONTRACTING COMPANY, to dredge to a depth of approximately 15 feet at mean low water on the property of Victor Borden in Dorchester. Granted June 13, 1916.

MISCELLANEOUS PERMITS GRANTED AND FISH WEIR PERMITS APPROVED BY THE COMMISSION ON WATERWAYS AND PUBLIC LANDS FROM AUG. 3, 1916, TO NOV. 30, 1916.

JAMES R. BAKER and ROBERT CLARK, to set and maintain an inshore fish weir in the waters of Yarmouth. Approval of permit issued Aug. 3, 1916, by selectmen of Yarmouth. Granted Aug. 9, 1916.

EDWARD J. SANDBERG, to use a lot of Commonwealth's land north of the Reserved Channel near L Street bridge, South Boston, for the purpose of storing granite. Granted Aug. 10, 1916.

NEW BEDFORD GAS and EDISON LIGHT COMPANY, to dredge in Acushnet River, New Bedford. Granted Aug. 15, 1916.

H. P. Converse & Co., to deposit temporarily in the dock of the Revere Sugar Refinery on Mystic River about 10,000 cubic yards of material. Granted Aug. 30, 1916.

Fore River Shipbuilding Corporation, to dredge in Weymouth Fore River, Quincy, to a depth of 16 feet at mean low water. Granted Sept. 1, 1916.

Fore River Shipbuilding Corporation, to dredge in Weymouth Fore River, Quincy, to depths varying from 15 to 25 feet at mean low water. Granted Sept. 1, 1916.

William M. Kendrick, to set, maintain and fish a fyke in creek 50 feet at least below dike that extends from Samuel Ryders Island, Chatham. Approval of permit issued Aug. 21, 1916, by selectmen of Chatham. Granted Sept. 7, 1916.

The Atlantic Coal Company, to dredge basin in front of its property in Fall River. Granted Sept. 12, 1916.

Orick D. Young, to set, maintain and fish a fyke in Henry Harding Creek, Chatham. Approval of permit issued Sept. 4, 1916, by selectmen of Chatham. Granted Sept. 12, 1916.

Morris & Cumings Dredging Company, to dump at the rehandling basin in East Boston not exceeding 50,000 cubic yards of material dredged from approaches to the dry dock. Granted Sept. 12, 1916.

Bay State Dredging and Contracting Company, to dump upon an area northerly of Governors Island not exceeding 50,000 cubic yards of material dredged from different parts of Boston Harbor. Granted Sept. 12, 1916.

Benjamin F. Wild, and others, to dredge in front of their upland on Bass River, South Yarmouth. Granted Sept. 18, 1916.

The Provincetown Cold Storage Company, to redredge berth and channel at and near its wharf in Provincetown Harbor. Granted Sept. 18, 1916.

Samuel A. Nickerson, to construct and maintain fykes in Hatches Creek, Eastham. Approval of permit issued Sept. 2, 1916, by selectmen of Eastham. Granted Sept. 20, 1916.

Augustus W. Baker, to set, maintain and fish a fyke in West Creek off Strong Island Meadow, so called, Chatham. Approval of permit issued Sept. 18, 1916, by selectmen of Chatham. Granted Sept. 26, 1916.

Frederick W. Baker, to set, maintain and fish a fyke in Frost Fish Creek, Chatham. Approval of permit issued Sept. 18, 1916, by selectmen of Chatham. Granted Sept. 26, 1916.

Edwin P. Cook, to erect and maintain a fyke in Duck Creek, Wellfleet. Approval of permit issued Sept. 9, 1916, by selectmen of Wellfleet. Granted Sept. 26, 1916.

David E. Curran, to erect and maintain fykes in the waters of Wellfleet. Approval of permit issued Aug. 26, 1916, by selectmen of Wellfleet. Granted Sept. 26, 1916.

LEONARD B. DILL, to erect and maintain fykes in Trout Brook Creek, Wellfleet. Approval of permit issued Sept. 9, 1916, by selectmen of Wellfleet. Granted Sept. 26, 1916.

OBED W. HORTON, to erect and maintain a fyke in Silver Spring Creek, Wellfleet. Approval of permit issued Sept. 9, 1916, by selectmen of Wellfleet. Granted Sept. 26, 1916.

FRANK A. WILLIAMS, to erect and maintain fykes in waters of Wellfleet. Approval of permit issued Aug. 26, 1916, by selectmen of Wellfleet. Granted Sept. 26, 1916.

H. P. CONVERSE & Co., to dump upon an area northerly of Governors Island not exceeding 10,000 cubic yards of material taken from the premises of the Revere Sugar Refinery on Mystic River. Granted Sept. 26, 1916.

J. S. PACKARD DREDGING COMPANY, to dredge from ten to fifteen thousand cubic yards of gravel from the westerly end of Thompson's Island in Boston Harbor. Granted Sept. 26, 1916.

THE CONSOLIDATED WEIR COMPANY, to dredge channel and berth at and near its wharf in Provincetown Harbor. Granted Oct. 2, 1916.

C. S. HENSHAW, to remove rocks from shore in front of two lots at Little Nahant, No. 100 owned by Harold D. Appollonio, and No. 102 owned by Mary D. Henshaw. Granted Oct. 3, 1916.

HUGH NAWN CONTRACTING COMPANY, to deposit upon an area northerly of Governors Island 5,000 cubic yards of material dredged from Mystic River. Granted Oct. 3, 1916.

J. S. PACKARD DREDGING COMPANY, to dump upon an area northerly of Governors Island not exceeding 75,000 cubic yards of material taken from the premises of the Revere Sugar Refining Company on Mystic River. Granted Oct. 6, 1916.

EUGENE B. ELLIS, to construct a fish trap in Mill Creek, Brewster. Approval of permit issued Sept. 20, 1916, by selectmen of Brewster. Granted Oct. 9, 1916.

TRUSTEES OF THE SUMMER STREET EXTENSION TRUST (Andrew G. Webster, Harry L. Rice and James R. Carter), to lay and operate a railroad track across Fargo Street, westerly of C Street, at South Boston. Granted Oct. 10, 1916.

J. S. PACKARD DREDGING COMPANY, to dredge not exceeding 20,000 cubic yards of material from the northeasterly side of the 27-foot channel of Boston Harbor, opposite the easterly and westerly ends of Lovells Island. Granted Oct. 18, 1916.

BOSTON DREDGING COMPANY, to dredge not exceeding 50,000 cubic yards of material from the ship channel near Lovells Island. Granted Oct. 18, 1916.

BOSTON FISH MARKET CORPORATION, to deposit in the extension of Northern Avenue, below the level of grade 14, ashes, cinders and dirt collected from the Fish Pier and adjoining premises leased by it. Granted Oct. 18, 1916.

GREENE & WOOD, to dredge in Acushnet River, New Bedford. Granted Oct. 18, 1916.

WILLIAM A. BLOOMER, to construct and maintain a fish weir in Chatham South Bay, Chatham. Approval of permit issued Oct. 16, 1916, by selectmen of Chatham. Granted Oct. 23, 1916.

ALONZO F. CAHOON, to construct and maintain a fish weir in Chatham South Bay, Chatham. Approval of permit issued Oct. 16, 1916, by selectmen of Chatham. Granted Oct. 23, 1916.

EDWIN F. DARLING, to construct and maintain a fish weir in tidewaters of Dennis. Approval of permit issued Oct. 3, 1916, by selectmen of Dennis. Granted Oct. 23, 1916.

BOSTON DREDGING COMPANY, to dredge not exceeding 50,000 cubic yards of material from Boston Harbor around Nix's Mate. Granted Oct. 23, 1916.

SUMMER STREET EXTENSION TRUST, to lower grade of sidewalk in front of its premises at the corner of Fargo and C streets, South Boston. Granted Oct. 24, 1916.

NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY, to attach its telephone wires to the poles of the Edison Electric Illuminating Company of Boston along Harbor Street on the South Boston Flats. Granted Oct. 27, 1916.

RALPH E. COOK, to erect and maintain fykes in Duck Creek, Wellfleet. Approval of permit issued Oct. 14, 1916, by selectmen of Wellfleet. Granted Oct. 30, 1916.

CLARENCE M. LOMBARD, to erect and maintain a fyke in Eastern Arm, Duck Creek, Wellfleet. Approval of permit issued Oct. 24, 1916, by selectmen of Wellfleet. Granted Oct. 30, 1916.

J. FRANK RICH, to erect and maintain eel pots in Black Fish Creek, Wellfleet. Approval of permit issued Sept. 15, 1916, by selectmen of Wellfleet. Granted Oct. 30, 1916.

BOSTON ELEVATED RAILWAY COMPANY, to dump snow and ice on Commonwealth's Flats at South Boston. Granted Nov. 1, 1916.

ATLANTIC COAL COMPANY of Taunton, extension of time for expiration of permit granted Sept. 12, 1916, to dredge from basin in front of its property in Fall River. Granted Nov. 6, 1916.

ESTATE OF P. O'RIORDEN, to transport and dump at sea, at least 10,000 feet east of a line drawn straight between Egg Rock and Minots Ledge Light, material loaded in dump scows from wharves in Boston. Granted Nov. 6, 1916.

J. S. PACKARD DREDGING COMPANY, to dump at the receiving basin on the East Boston Flats 150,000 cubic yards of sand and clay dredged from various portions of Boston Harbor. Granted Nov. 6, 1916.

CITY FUEL COMPANY, to dredge to a depth of 8 feet at mean low water from the Neponset River in front of its premises near Granite Avenue. Granted Nov. 6, 1916.

BROWN-WALES COMPANY, to dump cinders or engine ashes upon the Commonwealth's Flats at South Boston. Granted Nov. 6, 1916.

BAY STATE DREDGING AND CONTRACTING COMPANY, to dump at the receiving basin on the East Boston Flats 300,000 cubic yards of sand and clay dredged from various portions of Boston Harbor. Granted Nov. 13, 1916.

THE CONSOLIDATED WEIR COMPANY, to dump material, dredged in Provincetown Harbor, along shore in Provincetown Harbor. Granted Nov. 13, 1916.

ALFORD W. REED, to construct and maintain five fish traps in Namskaket Creek, Brewster. Approval of permit issued Nov. 1, 1916, by selectmen of Brewster. Granted Nov. 14, 1916.

THE GORTON-PEW FISHERIES COMPANY, to redredge berth in front of its property in Gloucester Harbor. Granted Nov. 16, 1916.

BOSTON STORAGE COMPANY, to dredge the berth at its wharf near the corner of Border and Summer streets, East Boston. Granted Nov. 20, 1916.

NILES NELSON, to construct and maintain a fish weir about 200 yards west of the mouth of Namskaket Creek, Brewster. Approval of permit issued Oct. 25, 1916, by selectmen of Brewster. Granted Nov. 21, 1916.

BORDER CITY MANUFACTURING COMPANY, to construct a pile dolphin in Taunton River, Fall River. Granted Nov. 28, 1916.

COLONIAL STEEL COMPANY, to dump cinders or engine ashes on the Commonwealth's Flats at South Boston. Granted Nov. 28, 1916.

ESTATE OF P. O'RIORDEN, to transport and dump at sea, east of a straight line between the dumping buoys in Broad Sound and Minots Ledge Light, material loaded in dump scows from wharves in Boston. Granted Nov. 28, 1916.

GERRISH DREDGING COMPANY, to redredge at Commercial Point 3,000 cubic yards of material transported and dumped there by the Maryland Dredging and Contracting Company. Granted Nov. 28, 1916.

CONSERVING AND EQUALIZING THE FLOW OF WATER IN RIVERS AND STREAMS.

By chapter 113 of the Resolves of 1915 the Board of Harbor and Land Commissioners was authorized and directed to investigate the matter of conserving and equalizing the flow of water in the rivers and natural streams of the Commonwealth, and authorized to expend for the purposes of this resolve during the years 1915, 1916 and 1917 not exceeding $20,000 in addition to the unexpended balance of an appropriation made to carry on an investigation of this matter under authority of chapter 95 of the Resolves of 1914.

The Board states in its annual report for 1915 that reference is made to a report of a special commission designated by chapter 129 of the Resolves of 1913 to investigate and report upon this matter, also a report of the Board under date of Jan. 13, 1915 (House Document No. 1725 of 1915), submitted in accordance with the requirements of chapter 95 of the Resolves of 1914, in which considerable information bearing on the matter of developed and undeveloped water power, etc., is given, as well as some of the problems involved in a complete and detailed investigation which it is intended that the resolve of 1915 aforesaid should cover.

The Commission reports that the work involved in the investigation of the conservation of the water resources of the State has continued throughout the year. The scope of the inquiry has thus far included the following rivers: Merrimac, Connecticut, Housatonic, Hoosac, Deerfield, Westfield, Farmington, Millers, Chicopee, Nashua, Ipswich, Charles and Neponset. The examination of the Blackstone River is in progress, and the Concord, French, Quinebog and Taunton rivers will be examined in the near future.

The investigation has consisted of a careful estimate of the capacity of each stream, based upon the run-off, also a determination of the developed and undeveloped storage, and a complete inventory of the existing water-power developments, including their size and location and a canvass of the undeveloped stretches of each river. The principal lakes and ponds are also being examined to determine the extent of their present use and future possibilities, and a reconnaissance has been made of the possible storage reservoir sites not covered by previous surveys. Actual surveys have been made of seven reservoir sites on the Westfield River and two on Millers River. Profiles have also been obtained of the Westfield River and the Nashua River, and this work is still in progress on the other streams where the data are not already in the possession of the Commission.

The investigation will be completed within the coming year and the cost will fall within the appropriation already made.

Total expenditure to Dec. 1, 1916, $13,355.14.

RE-ESTABLISHMENT OF CERTAIN TRIANGULATION POINTS.

By chapter 223 of the General Acts of 1915 the Board of Harbor and Land Commissioners was authorized to make such surveys and do such other work as may be required by any order of the Land Court to re-establish and permanently mark certain triangulation points and stations previously established in connection with the topographical survey of the Commonwealth and the town boundary survey, which have been lost or destroyed, and to obtain the geographical position of such new points and stations as may be required from time to time by the court. The Board was allowed to expend not exceeding $1,000 from the sum of $1,500 which may annually be paid out of the State treasury.

The Commission reports that during the year ending Nov. 30, 1916, the location of eleven triangulation stations and twelve bound stones have been determined in the town of Falmouth and four triangulation stations and four bound stones in the town of Wellesley, and the geographical positions of the same furnished to the Land Court.

Computations have also been made to determine the geographical positions of five triangulation stations and six bound stones in the town of Provincetown, and ten triangulation stations and ten property bounds in the town of Barnstable.

Amount expended during the year, $972.52.

Total expenditure to Dec. 1, 1916, $1,764.84.

The foregoing report is respectfully submitted.

JOHN N. COLE,
JESSE B. BAXTER,
WILLIAM S. McNARY,
Commissioners.

DEC. 1, 1916.

APPENDIX.

STATEMENT OF FINANCIAL CLERK, PORT FUNDS, DEC. 1, 1916.

Boston Harbor Minor Channels.

Appropriation (chapter 635, Acts of 1913),	$25,000 00
Appropriation (chapter 48, Acts of 1914),	25,000 00
Appropriation (chapter 35, Special Acts of 1915),	25,000 00
	$75,000 00

Expenditures.

	1913.	1914.	1915.	1916.	Total.
Contract work: —					
Jeffries Point Channel,	$1,000 00	–	–	–	$1,000 00
Winthrop Channel,	4,761 63	–	–	–	4,761 63
Houghs Neck Channel,	9,472 84	–	–	–	9,472 84
Elks Club Channel, Winthrop,	–	$4,000 00	–	–	4,000 00
Cottage Park,	–	2,922 92	–	–	2,922 92
Neponset River,	–	1,682 24	–	$7,790 56	9,472 80
Point Shirley,	–	1,150 00	–	–	1,150 00
Weymouth Fore River, dredging,	–	–	$6,193 40	–	6,193 40
Weymouth Fore River, dredging shoals,	–	–	993 75	660 00	1,653 75
Wollaston Channel,	–	–	3,734 63	9,252 01	12,986 64
Orient Heights Channel,	–	–	1,274 81	1,523 94	2,798 75
Mystic River dredging (near Lawrence & Wiggin Wharf),	–	–	5,268 04	659 66	5,927 70

Boston Harbor Minor Channels — *Concluded.*

Expenditures — Con.

	1913.	1914.	1915.	1916.	Total.	
Contract work — *concluded.*						
Wessagussett Channel,	–	–	$767 72	$47 48	$815 20	
Pleasant Park Yacht Club Channel, Winthrop,	–	–	–	3,033 96	3,033 96	
Engineering,	$2,070 29	$272 11	3,966 22	2,496 53	8,805 15	
	$17,304 76	$10,027 27	$22,198 57	$25,464 14	$74,994 74	
Total expenditures,						$74,994 74
Unexpended balance Dec. 1, 1916,						$5 26

Commonwealth Flats Improvement Fund.[1]

Total in fund Nov. 30, 1915,	$36,867 70
Transferred to Port of Boston Fund, May 31, 1916,	36,867 70

Income of Harbor Compensation Fund.

Amount in fund Dec. 1, 1911,	$631,513 06
Balance of income Nov. 30, 1911,	$757 09
Accrued, Dec. 1, 1911, to Nov. 30, 1912,	22,823 03
	$23,580 12
Expenditures, 1912,	19,768 53
Balance of income Nov. 30, 1912,	$3,811 59

1913.		
Accrued Dec. 1, 1912, to Nov. 30, 1913,		23,533 55
		$27,345 14
Expenditures, 1913,		6,734 35
Balance of income Nov. 30, 1913,		$20,610 79
1914.		
Accrued Dec. 1, 1913, to Nov. 30, 1914,		22,047 64
		$42,658 43
Expenditures, 1914,		25,366 46
Balance of income Nov. 30, 1914,		$17,291 97
1915.		
Accrued Dec. 1, 1914, to Nov. 30, 1915,		25,983 65
		$43,275 62
Expenditures, 1915: —		
Directors,	$8,702 17	
State Treasurer,	115 66	
State Treasurer,	10 79	
		8,828 62
Balance of income Nov. 30, 1915,		$34,447 00

[1] For previous expenditures, see former reports of Directors of the Port of Boston and Harbor and Land Commissioners.

INCOME OF HARBOR COMPENSATION FUND — *Concluded.*

1915 — Con.

Accrued Dec. 1, 1915, to Nov. 30, 1916,	$28,398 76
	$62,845 76
Expenditures, 1916,	54,719 92
Balance of income Nov. 30, 1916,	$8,125 84

Expenditures.

	1912.	1913.	1914.	1915.	1916.	Total.
Construction work: —						
Dredging opposite Leyland Line pier,	$19,232 03	–	–	–	–	$19,232 03
Dredging berth for training ship,	446 50	–	–	–	–	446 50
Dredging opposite Grand Junction wharves,	–	$6,734 35	–	–	–	6,734 35
Dredging Mystic River,	–	–	$1,439 12	–	–	1,439 12
Dredging Mystic River near Mystic Wharf,	–	–	14,518 40	–	–	14,518 40
Dredging Mystic River west of Chelsea Bridge,	–	–	–	–	$40,336 74	40,336 74
Dredging opposite Long and Central wharves and National Docks,	–	–	7,456 84	$7,841 26	–	15,298 10
Engineering,	90 00	–	1,952 10	860 91	2,835 62	5,738 63
Payments by State Treasurer,	–	–	–	126 45	11,547 56	11,674 01
	$19,768 53	$6,734 35	$25,366 46	$8,828 62	$54,719 92	$115,417 88
Amount in Harbor Compensation Fund Nov. 30, 1916,						$465,494 73

Port of Boston Fund.

1912.

Transfer from Commonwealth Flats Improvement Fund, receipts Dec. 1, 1911, to June 13, 1912 (chapter 663, Acts of 1912),			$71,654 01
Income June 13, 1912, to Nov. 30, 1912,			37,445 25
			$109,099 26
Appropriation (chapter 663, Acts of 1912),		$60,000 00	
Expenditures, salaries and expenses,		42,771 69	42,771 69
Unexpended balance of appropriation,		$17,228 31	
Balance in fund Nov. 30, 1912,			$66,327 57

1913.

Income Dec. 1, 1912, to Nov. 30, 1913,			54,128 91
			$120,456 48
Appropriation (chapter 283, Acts of 1913),	$85,000 00		
Expenditures, salaries and expenses,	80,973 92	$80,973 92	
Unexpended balance of appropriation,	$4,026 08		
Expenditures from fund at large, operation and maintenance, Commonwealth Pier No. 5 (chapter 663, Acts of 1912),		7,671 43	
Reimbursement to Old Colony Railroad of overpayment of rent (chapter 31, Resolves of 1913),		11,666 67	
Total expenditures,			100,312 02
Balance in fund Nov. 30, 1913,			$20,144 46

1914.

Income Dec. 1, 1913, to Nov. 30, 1914,			118,391 81
			$138,536 27
Appropriation (chapter 303, Acts of 1914),	$80,000 00		
Expenditures, salaries and expenses,	74,794 71	$74,794 71	
Unexpended balance of appropriation,	$5,205 29		
Expenditures, publicity (chapter 712, Acts of 1914),		663 84	
Expenditures from fund at large (chapter 663, Acts of 1912), operation and maintenance, Commonwealth Pier No. 5,		35,814 62	
Total expenditures,			111,273 17
Balance in fund Nov. 30, 1914,			$27,263 10

1915.			
Income Dec. 1, 1914, to Nov. 30, 1915,			$171,989 12
			$199,252 22
Appropriation (chapter 308, Special Acts of 1915),	$80,000 00		
Expenditures, salaries and expenses,	75,085 57	$75,085 57	
Unexpended balance of appropriation,	$4,914 43		
Appropriation, publicity (chapter 712, Acts of 1912) (balance Dec. 1, 1914),	$1,504 93		
Appropriation (chapter 308, Special Acts of 1915),	2,000 00		
	$3,504 93		
Expenditures,	3,134 72	3,134 72	
Unexpended balance of appropriation,	$370 21		
Expenditures from fund at large (chapter 663, Acts of 1912), operation and maintenance of Commonwealth's property,		47,476 56	
Expenditures by State Treasurer,		747 20	
			126,444 05
Balance in fund Nov. 30, 1915,			$72,808 17
1916.			
Income Dec. 1, 1915, to Nov. 30, 1916,			195,961 90
			$268,770 07
Appropriation (chapter 170, Special Acts of 1916),	$85,000 00		
Balance Dec. 1, 1915,	143 24		
	$85,143 24		
Expenditures, salaries and expenses,	69,331 82	$69,331 82	
Unexpended balance of appropriation,	$15,811 42		
Appropriation, publicity (chapter 170, Special Acts of 1916),	$5,000 00		
Balance Dec. 1, 1915,	112 85		
	$5,112 85		
Expenditures,	2,947 64	2,947 64	
Unexpended balance of appropriation,	$2,165 21		
Expenditures from fund at large (chapter 663, Acts of 1912), operation and maintenance of Commonwealth's property,		79,117 77	
			151,397 23
Balance in fund Nov. 30, 1916,			$117,372 84

RECEIPTS.

Port of Boston Fund.

Rent under leases and permits,	$66,544 62	
Dumping inspection,	2,794 61	
Commonwealth Pier No. 5,	52,312 53	
Commonwealth Pier No. 1,	1,200 00	
Dumping dredged material, East Boston,	17,729 08	
Maverick Street property,	720 00	
Certified copying,	62 00	
Interest,	347 24	
Sale of land,	16,732 80	
Miscellaneous,	651 32	
	$159,094 20	
Receipts of State Treasurer (transfer of balance of Commonwealth Flats Improvement Fund),	36,867 70	
		$195,961 90

Harbor Compensation Fund.

Rent,	$50 00	
Charges under licenses,	8,116 55	
		8,166 55
		$204,128 45

Development of the Port of Boston Loan Fund.

Bonds authorized by chapter 748, Acts of 1911,		$9,000,000 00
Bonds sold in 1913,	$3,000,000 00	
Bonds sold in 1914,	3,000,000 00	
Bonds sold in 1915,	1,000,000 00	

Expenditures.

	1913.	1914.	1915.	1916.	Total.
Hayward Creek,	–	–	–	$310 68	$310 68
Commercial Point, Dorchester Bay.					
Appropriation from Development of the Port of Boston Loan Fund (chapter 602, Acts of 1914), $58,000,	–	–	–	–	–
Contract work: —					
Commercial Point, dredging,	–	$23,196 07	$26,707 49	–	$49,903 56
Freeport Street, dredging,	–	–	449 65	–	449 65
Engineering,	–	1,716 64	1,143 25	–	2,859 89
	–	$24,912 71	$28,300 39	–	$53,213 10
Dry Dock.					
Contract work: —					
Bulkhead,	$11,288 00*	$149,822 07	$6,629 61	$10,274 38	$178,014 06
Dredging and filling,	–	96,411 00	140,471 16	41,726 20	278,608 36
Dredging Reserved Channel,	–	8,527 43	22,933 65	–	31,461 08
Borings,	–	543 00	1,899 90	–	2,442 90
Construction,	–	–	–	99,645 76	99,645 76
Engineering,	2,584 02	18,155 92	22,532 65	36,732 86	80,005 45
	$13,872 02	$273,459 42	$194,466 97	$188,379 20	$670,177 61

East Boston.					
Contract work: —					
Borings,	$3,320 75	–	–	–	$3,320 75
Dredging opposite Pier No. 1,	–	$45,139 28	$11,455 43	$5,647 25	62,241 96
Jeffries Point ranges,	–	–	213 58	–	213 58
Takings,	–	779,184 05	61,126 86	514,566 30	1,354,877 21
Reclamation of flats,	–	–	–	195,388 52	195,388 52
Jeffries Point bulkhead,	–	–	–	75,488 32	75,488 32
Engineering,	2,894 28	20,029 88	6,295 60	12,968 57	42,188 33
	$6,215 03	$844,353 21	$79,091 47	$804,058 96	$1,733,718 67
South Boston.					
Contract work: —					
Commonwealth Pier No. 5,	$1,600,036 35	$1,129,498 75	$44,476 35	$72,259 58	$2,846,271 03
Commonwealth Pier No. 5 (miscellaneous and extra work),	10,459 60	–	–	–	10,459 60
Miscellaneous painting,	–	6,170 15	2,369 85	–	8,540 00
Cargo hoists,	–	9,723 91	2,318 09	–	12,042 00
Covering pipes,	–	–	3,949 00	–	3,949 00
Painting Kinnear doors and sprinkler pipes in head house,	–	–	295 00	–	295 00
Steel signs,	–	–	22 50	–	22 50
Viaduct,	–	106,160 18	–	–	106,160 18
Viaduct foundation,	24,605 80	95,544 21	7,831 80	–	127,981 81
Viaduct superstructure,	–	86,417 41	4,548 29	–	90,965 70
Dredging opposite Pier No. 5 and approaches,	94,830 00	–	–	–	94,830 00
Dredging opposite Pier No. 5 and approaches,	–	40,134 97	2,358 44	–	42,493 41
Grain elevator "Golder,"	31,191 57	–	–	–	31,191 57
Grain elevator "Moulton,"	–	25,939 25	3,360 75	–	29,300 00
Commonwealth Pier No. 6 (account of claims of Tyson, Weare & Marshall),	–	–	18,500 00	45,590 33	64,090 33

DEVELOPMENT OF THE PORT OF BOSTON LOAN FUND — *Concluded.*

Expenditures — Con.

	1913.	1914.	1915.	1916.	Total.	
SOUTH BOSTON — *Concluded.*						
Northern Avenue, paving and regulating,	–	–	$6,561 19	–	$6,561 19	
Railroad yard,	–	–	458 10	–	458 10	
Northern Avenue, repair,	–	–	2,282 31	–	2,282 31	
Northern Avenue, bulkhead,	–	–	–	$15,494 05	15,494 05	
Northern Avenue, test borings,	–	–	–	287 00	287 00	
Tide gage,	–	–	–	237 00	237 00	
Commonwealth Pier No. 6, breakwater,	–	–	16,977 53	–	16,977 53	
Northern Avenue fence,	–	–	710 00	–	710 00	
Engineering,	$125,938 55	$57,820 05	23,121 24	18,662 10	225,541 94	
	$1,887,061 87	$1,557,408 88	$140,140 44	$152,530 06	$3,737,141 25	
MYSTIC RIVER AT MALDEN BRIDGE.						
Appropriation from Development of the Port of Boston Loan Fund (chapter 337, Special Acts of 1915), $25,000,	–	–	–	–	–	
Contract work: —						
Mystic River, dredging,	–	–	$3,381 94	$325 91	$3,707 85	
Engineering,	–	–	577 12	18 49	595 61	
	–	–	$3,959 06	$344 40	$4,303 46	
MYSTIC RIVER IMPROVEMENT.						
Appropriation from Development of the Port of Boston Loan Fund (chapter 253, General Acts of 1916) (see Mystic River Improvement),	–	–	–	$75,000 00	$75,000 00	
Total expenditures,						$6,273,864 77

Unexpended balance Nov. 30, 1916: —			
Allotted,		$2,224,373 43	
Unallotted,		501,761 80	
			$2,726,135 23

MYSTIC RIVER IMPROVEMENT.

Appropriation (chapter 253, General Acts of 1916), $275,000 (Development of the Port of Boston Loan Fund, $75,000, Harbor Compensation Fund, $200,000),			$275,000 00
Dredging,	$37,559 45		
Engineering,	1,198 30		
		$38,757 75	38,757 75
Unexpended balance,			$236,242 25

HARBOR IMPROVEMENT LOAN FUND.

Appropriation (chapter 486, Acts of 1897), balance brought forward,	$65,392 81
East Boston takings,	65,392 81

Total expenditure from above funds during 1916, $1,481,355.15.

CONTRACTS MADE BY THE BOARD OF HARBOR AND LAND

Contract No.	Work.	Contractor.	Date.	To be completed.
185	Ipswich River, Ipswich, concrete wall and timber bulkhead.	Rendle & Stoddard, .	June 30, 1914	Nov. 1, 1914
197	Lynn Harbor and Saugus River, dredging channel and constructing dike.	Eastern Dredging Company.	Oct. 6, 1914	Nov. 1, 1915
205	New Bedford, pier and steel shed.	W. H. Ellis & Son Company.	Jan. 5, 1915	Sept. 15, 1916
206	Hatfield, Connecticut River, rip-rapping bank.	Daniel O'Connell's Sons,	May 12, 1915	Nov. 1, 1915
209	Bass River, Dennis and Yarmouth, dredging channel.	Eastern Dredging Company.	Apr. 15, 1915	Sept. 1, 1915
212A	Vineyard Haven, Tisbury, extension of concrete sea wall.	Herbert N. Hinckley, .	Nov. 11, 1915	Jan. 1, 1916
224	Wellfleet Harbor, dredging channel and basin.	John H. Gerrish, . .	Aug. 4, 1915	Jan. 1, 1916
225	Ipswich River, Ipswich, dredging channel.	John H. Gerrish, . .	Aug. 10, 1915	Jan. 1, 1916
228	Lynn Harbor, enlarging anchorage basin.	J. S. Packard Dredging Company.	July 21, 1915	Jan. 1, 1916
229	Nobscusset Harbor, Dennis, dredging channel and basin.	John H. Gerrish, . .	Aug. 4, 1915	Feb. 1, 1916
230	Barnstable Harbor, dredging channel and basin.	John H. Gerrish, . .	Aug. 4, 1915	Feb. 1, 1916
233	Concord River, Billerica, removing bowlders.	Cape Ann Granite Corporation.	Sept. 21, 1915	Jan. 1, 1916
234	Winthrop shore protection,	William L. Miller Company.	Nov. 5, 1915	Aug. 1, 1916
235	Lewis Bay, Barnstable and Yarmouth, dredging channels and basin.	John R. Burke, . .	Sept. 22, 1915	June 1, 1916
237	Brant Rock, Marshfield, repairing sea wall.	Dennis F. Crowley, .	Oct. 27, 1915	Jan. 1, 1916
238	Scituate, Third Cliff, repairing rip-rap.	Dennis F. Crowley, .	Nov. 2, 1915	Jan. 1, 1916

COMMISSIONERS AND PENDING DURING THE YEAR 1916.

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
Suspended, .	Lump sum, ...	-	$1,382 78	$2,324 00
Completed July 22, 1916.	Dredging, 29 cents per cubic yard, measured *in situ* or in scows. Building dike, $2 per lineal foot. Excavating bowlders, $7.50 per cubic yard.	$32,454 47	88,663 27	90,500 00
In progress, .	Unit prices, ...	153,497 09	258,984 80	316,872 00
Completed Sept. 28, 1916.	For furnishing and placing stone and all incidental work, $1.85 per ton of 2,000 pounds.	2,498 24	2,498 24	2,497 50
Completed July 31, 1916.	Dredging, 26.75 cents per cubic yard, measured in scows. Excavating bowlders, $9.50 per cubic yard.	5,941 17	14,967 96	14,177 50
Completed Dec. 7, 1915.	$9 per cubic yard of concrete, measured in place in completed work.	749 00	749 00	747 00
Contract abrogated Feb. 24, 1916.	Dredging, 14.3 cents per cubic yard, measured in scows. Excavating bowlders, $6 per cubic yard.	-	-	8,151 00
Contract cancelled Feb. 24, 1916.	Dredging, 31.7 cents per cubic yard, measured in scows. Excavating bowlders, $6 per cubic yard.	850 87	850 87	10,000 00
Completed, .	For dredging and disposing of dredged material, as provided, $30,000.	30,000 00	30,000 00	30,000 00
Contract cancelled Feb. 2, 1916.	Dredging, 18.3 cents per cubic yard, measured in scows or *in situ*. Excavating bowlders, $8 per cubic yard.	-	-	9,500 00
Contract cancelled Feb. 2, 1916.	Dredging, 16.3 cents per cubic yard, measured *in situ*. Excavating bowlders, $6 per cubic yard.	-	-	14,250 00
Work completed Dec. 18, 1915.	Excavating bowlders and ledges and disposing of same, $7.50 per ton of 2,000 pounds.	1,477 50	1,477 50	1,650 00
Completed July 29, 1916.	$6.09 per cubic yard of concrete, measured in place in completed work; $6.50 for each linear foot of pile and timber jetty in place; $6.33 for each linear foot of pile and timber bulkhead in place.	17,284 08	17,284 08	17,000 00
Completed June 24, 1916.	Dredging, 23.4 cents per cubic yard, measured in scows. Excavating bowlders, $10 for each cubic yard.	9,861 95	9,861 95	8,000 00
Completed Jan. 15, 1916.	$5.20 per day for masons; $2.50 per day for laborers; $6 per day for two-horse teams, including driver; $30 per week for foreman; $2 per barrel for Portland cement; plus 15 per cent.	949 24	949 24	1,000 00
Completed Apr. 18, 1916.	For furnishing and placing stone, $2.45 per ton of 2,000 pounds.	227 91	735 00	735 00

CONTRACTS MADE BY THE BOARD OF HARBOR AND LAND

Contract No.	Work.	Contractor.	Date.	To be completed.
239	Warrens Cove, Plymouth, concrete sea wall.	Dennis F. Crowley, .	Nov. 5, 1915	Jan. 1, 1916
240	State Pier, New Bedford, moving immigration shed.	Hand & White Company.	Jan. 11, 1916	- -
242	Wellfleet Harbor, dredging channel and basin.	Maryland Dredging and Contracting Company.	Apr. 11, 1916	Oct. 1, 1916
243	Ipswich River, Ipswich, dredging channel.	Gerrish Dredging Company.	Apr. 11, 1916	July 1, 1916
244	Nobscusset Harbor, Dennis, dredging channel and basin.	Maryland Dredging and Contracting Company.	Apr. 11, 1916	Oct. 1, 1916
245	Barnstable Harbor, dredging channel and basin.	Gerrish Dredging Company.	Apr. 11, 1916	Aug. 1, 1916
246	Wareham River, dredging channel.	Charles M. Cole, . .	June 28, 1916	Jan. 1, 1917
247	Hyannisport, raising and extending breakwater and removing rocks.	Bay State Dredging and Contracting Company.	June 14, 1916	Dec. 1, 1916
248	Cuttyhunk Harbor, widening basin.	J. S. Packard Dredging Company.	June 28, 1916	Nov. 1, 1916
249	Warrens Cove, Plymouth, concrete sea wall.	Cecil M. Leach, . .	June 15, 1916	Nov. 1, 1916
250	Duxbury Bay, dredging, .	Bay State Dredging and Contracting Company.	June 28, 1916	Nov. 1, 1916
251	Gun Rock Point, Hull, breakwater.	Rockport Granite Company.	July 5, 1916	Nov. 1, 1916
252	Apponagansett River, Dartmouth, dredging.	John R. Burke, . .	June 28, 1916	Nov. 1, 1916

COMMISSIONERS AND PENDING DURING THE YEAR 1916 — *Continued.*

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
Completed Feb. 2, 1916.	$5.70 per cubic yard of concrete measured in place in completed work.	$4,172 97	$4,172 97	$4,161 00
Completed Apr. 17, 1916.	For moving building to temporary and permanent locations, etc., $1,875. For moving building to temporary location by order of engineer, $100 additional.	1,875 00	1,875 00	1,975 00
Completed Sept. 21, 1916.	Dredging, 19.53 cents per cubic yard, measured in scows. Excavating bowlders, $9.50 per cubic yard.	14,759 21	14,759 21	16,500 00
Completed Oct. 21, 1916.	Dredging 26.7 cents per cubic yard, measured in scows, disposed of at dumping ground in Neck Cove. Excavating bowlders, $6 per yard. Dredging and disposing of dredged material on land and flats, 26.7 cents per cubic yard, measured *in situ*.	23,360 25	23,360 25	25,899 00
In progress,	Dredging, 27.53 cents per cubic yard, measured in scows. Excavating bowlders, $9.50 per cubic yard. Dredging and disposing of dredged material on land and flats, 27.53 cents per cubic yard, measured *in situ*.	-	-	9,300 00
In progress,	Dredging, 16.3 cents per cubic yard, measured *in situ*. Excavating bowlders, $6 for each cubic yard.	7,066 05	7,066 05	20,000 00
In progress,	Dredging, 29.49 cents per cubic yard, measured in scows. Excavating bowlders, $9.50 for each cubic yard.	16,867 02	16,867 02	30,000 00
Completed Oct. 21, 1916,	For capstones in place, $5 per ton. For stone in place, $2.80 per ton. For iron clamps and pins, 35 cents per pound in place. For removing rocks from harbor and placing them, $6 per ton.	26,529 83	26,529 83	27,500 00
Completed Sept. 11, 1916,	Dredging, 29.97 cents per cubic yard, measured in scows. Excavating bowlders, $7 for each cubic yard.	8,991 60	8,991 60	9,000 00
In progress,	$7.93 per cubic yard of concrete, measured in place in completed work. For piles in place, 45 cents per linear foot.	2,177 18	2,177 18	13,500 00
Completed Nov. 15, 1916.	For dredging, 36 cents per cubic yard, measured in scows. Excavating bowlders, $12 per cubic yard.	6,999 44	6,999 44	7,320 00
Completed Nov. 29, 1916.	$1.55 per ton of stone in place,	14,113 06	14,113 06	25,000 00
Completed Sept. 28, 1916,	For dredging, 38.5 cents per cubic yard, measured in scows. Excavating bowlders, $10 per cubic yard.	4,654 65	4,654 65	4,600 00

CONTRACTS MADE BY THE BOARD OF HARBOR AND LAND

Contract No.	WORK.	Contractor.	Date.	To be completed.
255	Sandwich Harbor, repairing and extending jetties.	Rockport Granite Company.	July 5, 1916	Nov. 1, 1916
256	Plymouth Harbor, dredging channel.	Boston Dredging Company.	June 29, 1916	Nov. 1, 1916

CONTRACTS AWARDED BY THE DIRECTORS OF THE PORT OF BOSTON

Contract No.	WORK.	Contractor.	Date.	To be completed.
18	Dredging at Commonwealth Pier No. 1, East Boston.	Bay State Dredging Company.	Jan. 15, 1914	Oct. 1, 1914
25	Dry dock, ...	Holbrook, Cabot & Rollins Corporation.	June 22, 1914	Aug. 13, 1918
38	Dredging at Wollaston Beach.	Morris & Cummings Dredging Company.	Apr. 15, 1915	Sept. 14, 1915
40	Dredging at Pleasant Park Yacht Club, Winthrop.	J. P. O'Riorden, . .	Aug. 26, 1915	Nov. 17, 1915
41	Dredging at Orient Heights Yacht Club, East Boston.	J. P. O'Riorden, . .	Aug. 17, 1915	Nov. 18, 1915
43	Dredging in Mystic River at Malden Bridge.	J. P. O'Riorden, . .	Aug. 17, 1915	Oct. 19, 1915
45	Dredging in Neponset River at Milton Lower Mills.	Gerrish Dredging Company.	Jan. 4, 1916	Apr. 11, 1916
47	Bulkhead and filling off Jeffries Point, East Boston.	Bay State Dredging and Contracting Company.	Nov. 29, 1915	June 1, 1916
48	Building pipe sewer in Fargo Street, South Boston.	James H. Ferguson, .	Dec. 31, 1915	Mar. 5, 1916
49	Bulkhead along Northern Avenue Extension, South Boston.	W. H. Ellis & Son Company.	Apr. 17, 1916	Oct. 26, 1916
50	Dredging in Mystic River off Mystic Wharf.	Maryland Dredging and Contracting Company.	Mar. 8, 1916	Sept. 24, 1916
51	Reclamation of flats at East Boston.	Atlantic, Gulf and Pacific Company.	Mar. 14, 1916	July 1, 1918
52	Dredging in Mystic River,	Maryland Dredging and Contracting Company.	June 27, 1916	Feb. 1, 1918
–	Dredging in front of National Docks, East Boston and between Long and Central wharves, Boston proper.	Eastern Dredging Company.	Apr. 24, 1914	– –

COMMISSIONERS AND PENDING DURING THE YEAR 1916 — *Concluded.*

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
Completed Sept. 15, 1916,	Stone in place, $2.40 per ton,	$4,600 80	$4,600 80	$5,000 00
In progress,	For dredging, 24.9 cents per cubic yard, measured in scows. For excavating bowlders, $9.50 per cubic yard.	2,320 32	2,320 32	15,000 00

AND IN FORCE DURING THE FISCAL YEAR ENDING NOV. 30, 1916.

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
Completed Dec. 22, 1915.	15 cents per cubic yard outside harbor line; 16 cents per cubic yard inside harbor line, scow measurement.	$5,647 25	$62,241 96	$80,802 50
In progress,	Unit prices,	99,645 76	99,645 76	1,865,157 25
Completed June 9, 1916.	12 cents per cubic yard,	9,252 01	12,986 64	11,580 00
Completed Dec. 8, 1915.	16⅔ cents per cubic yard,	3,033 96	3,033 96	2,531 25
Completed Dec. 13, 1915.	19½ cents per cubic yard,	1,523 94	2,798 75	3,002 62
Completed Dec. 13, 1915.	11½ cents per cubic yard,	325 91	3,707 85	4,149 62
Completed May 27, 1916.	23.4 cents per cubic yard,	7,790 56	7,790 56	8,190 00
Completed Sept. 20, 1916.	Unit prices,	75,488 32	75,488 32	82,830 00
Completed May 11, 1916.	Unit prices,	3,355 43	3,355 43	3,148 90
In progress,	Unit prices,	15,494 05	15,494 05	25,085 00
In progress,	11.85 cents per cubic yard,	40,336 74	40,336 74	53,325 00
In progress,	15.47 cents per cubic yard,	195,388 52	195,388 52	541,450 00
In progress,	12.95 cents per cubic yard,	37,559 45	37,559 45	270,000 00
In progress,	15 cents per cubic yard, measured in scows.	—	15,298 10	11,250 00

CONTRACTS AWARDED BY THE DIRECTORS OF THE PORT OF BOSTON AND

Contract No.	Work.	Contractor.	Date.	To be completed.
-	Altering nine pairs of doors, Commonwealth Pier No. 5, South Boston.	Fisher, McCurdy & Co.,	Nov. 24, 1915	- -
-	Test borings on Northern Avenue.	Charles R. Gow Company.	Jan. 5, 1916	- -
-	Dragging shoals, Weymouth Fore River.	Bay State Dredging and Contracting Company.	Jan. 29, 1916	Feb. 5, 1916
-	Range piles, East Boston, .	W. H. Ellis & Son Company.	Jan. 18, 1916	- -
-	Range piles, East Boston, .	W. H. Ellis & Son Company.	Mar. 11, 1916	- -
-	Range piles, East Boston, .	W. H. Ellis & Son Company.	Mar. 30 and Apr. 11, 1916	Apr. 18, 1916
-	Lighting range piles off Jeffries Point, East Boston.	Harry P. Williams, .	Jan. 19, 1916	- -
-	Lighting range piles off Jeffries Point, East Boston.	Harry P. Williams, .	May 17, 1916	- -

CONTRACTS MADE BY THE COMMISSION ON WATERWAYS

Contract No.	Work.	Contractor.	Date.	To be completed.
1	Gloucester Harbor, dredging channel.	Boston Dredging Company.	Aug. 18, 1916	Dec. 1, 1916
2	Popponesset Bay, dredging channel.	Bay State Dredging and Contracting Company.	Aug. 2, 1916	Dec. 1, 1916
3	Scituate, Cedar Point and North Scituate, sea walls.	Dennis F. Crowley, .	Aug. 2, 1916	Nov. 1, 1916
4	Waquoit Bay, breakwater and wall.	John R. Burke, . .	Aug. 2, 1916	Dec. 1, 1916
5	Chicopee, Connecticut River, retaining wall and rip-rap.	Dennis F. Crowley, .	Aug. 18, 1916	Nov. 1, 1916
7	Herring River, Harwich, building jetties and repairing bulkhead.	Nickerson & Freeman,	Sept. 26, 1916	Dec. 1, 1916
8	Dredging opposite Pier No. 2, South Boston.	Bay State Dredging and Contracting Company.	Oct. 23, 1916	Dec. 26, 1916

IN FORCE DURING THE FISCAL YEAR ENDING Nov. 30, 1916 — *Concluded.*

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
Completed Dec. 14, 1915.	Lump sum, ...	$86 25	$86 25	$85 00
Completed Jan. 25, 1916.	40 cents per linear foot of boring, .	287 00	287 00	–
Completed Feb. 5, 1916.	$110 per day, ...	660 00	660 00	–
Completed Jan. 21, 1916.	Unit prices, ...			
Completed Mar. 14, 1916.	Unit prices, ...	581 36	581 36	–
Completed Apr. 20, 1916.	Unit prices, ...			
Completed May 11, 1916.	$3 per day, ...			
Completed Sept. 30, 1916.	$2 per day, ...	636 00	636 00	–

AND PUBLIC LANDS AND PENDING DURING THE YEAR 1916.

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
Completed Nov. 29, 1916.	Dredging, 47¼ cents per cubic yard, measured in scows. Excavating bowlders, $9.50 per cubic yard. Excavating bowlders over 5 cubic yards in volume, and ledge, $15 per cubic yard.	$5,498 38	$5,498 38	$9,000 00
In progress, .	Dredging, 46.7 cents per cubic yard, measured in scows. Excavating bowlders, $12 per cubic yard.	4,570 88	4,570 88	13,500 00
Completed Oct. 28, 1916.	$6.70 per cubic yard of concrete, measured in place, in completed work.	5,991 14	5,991 14	7,050 00
In progress, .	For stone in place in breakwater, $2.95 per ton. For stone in place in wall, $3.95. For timber bulkhead, $4.90 per linear foot.	–	–	13,900 00
In progress, .	$10.30 per cubic yard of concrete in place; $3 per ton of 2,000 pounds for stone in place.	998 77	998 77	9,000 00
Completed, .	For materials and work, $696, .	696 00	696 00	696 00
Completed Nov. 2, 1916.	48 cents per cubic yard, . .	–	–	2,500 00

CONTRACTS MADE BY THE COMMISSION ON WATERWAYS AND

Contract No.	Work.	Contractor.	Date.	To be completed.
9	Extension of contract No. 51 (Directors of the Port of Boston) for dredging and filling at East Boston.	Atlantic, Gulf & Pacific Company.	Oct. 6, 1916	July 1, 1918
10	Furnishing and erecting ladders and steps at Commonwealth Pier No. 5.	W. A. Snow Iron Works, Inc.	Nov. 6, 1916	Mar. 1, 1917
-	Dolphins B, C and D on Bird Island Flats.	Bay State Dredging and Contracting Company.	Oct. 18, 1916	- -
-	Test borings at dry dock, .	Charles R. Gow Company.	- -	- -

PUBLIC LANDS AND PENDING DURING THE YEAR 1916 — *Concluded.*

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1916.	Total paid to Nov. 30, 1916.	Estimated Amount of Contract.
In progress, .	15.47 cents per cubic yard, . .	–[1]	–[1]	–[1]
In progress, .	Lump sum, ...	–	–	$1,315 00
Completed Nov. 2, 1916.	Lump sum, ...	$200 00	$200 00	150 00
Completed Oct. 13, 1916.	Unit prices, ...	545 70	545 70	–

[1] See Contract No. 51 (Directors of the Port of Boston).

BUSINESS TRANSACTED AT COMMONWEALTH PIER NO. 5, SOUTH BOSTON, DURING THE FISCAL YEAR ENDING NOV. 30, 1916.

The acting superintendent of terminals in his report to the Commission as to the business transacted at this terminal during the fiscal year ending Nov. 30, 1916, states that 109 ships, of a gross tonnage of 670,072 tons, have been taken care of, a gain of 67½ per cent. over last year. The income from operation of the pier was $44,975.80, showing a gain of 60 per cent.; balance of income, $8,193.75, was received for dockage, making a total of $53,169.55.

Since the European war commenced the west side of the pier has been used by the Hamburg-American Line for tying up its ships "Amerika" and "Cincinnati," consequently it has not been possible to use the whole of the pier for the unloading and loading of ships. In February, 1916, these ships were removed to East Boston, and for about nine months it has been demonstrated that the pier is a great convenience and has proved to be of large value to the Port of Boston. But for its existence the many ships accommodated here would have been compelled to anchor in the harbor for an indefinite period, or go to some other port to unload.

As an illustration of its capacity and availability, the steamships "Ohioan," "Minnesotan" and "Texan" arrived recently from South American ports and were unloaded here. Their cargoes consisted of 14,500 bales of wool (weighing half a ton each), 60,350 hides, 790 bales of skins, 670 bags of caseine and 250 casks of pelts. These cargoes were unloaded in seventy-four hours. With these cargoes still on the pier, the work of unloading the steamships "Sabine" and "Royal Prince," from South African ports, was carried on. These ships had 7,330 bales of wool, mohair and skins, and 10,000 bags of bark. It is doubtful if there is another single pier in the United States with the capacity for handling the work which has been carried on here recently.

The arrivals during the year were as follows: —

	Ships.
From Montevideo and Buenos Aires,	32
From China, Japan and Manila,	21
From South African ports,	17
From Mediterranean ports,	12
From Australia and New Zealand,	8

	Ships.
From Liverpool and Manchester,	3
From New York, for passengers,	3
From Calcutta,	2
From Huelva, Spain,	2
From Chili and Frey Bentos,	2
From Copenhagen,	1
From Almeria, Spain,	1
For dockage,	5
Total,	109

There were discharged from and loaded into these ships 163,286 tons of merchandise, showing a gain of 91¾ per cent. over the preceding year.

The cost of operating this terminal has recently been somewhat lessened. In May, 1916, there were 41 persons on the pay roll, at an expense of $797.79 per week. At the end of November, 1916, the pay roll showed 24 persons employed, at an expense of $493.61, making a saving of $304.18 per week, or $15,871.36 per year.

During the past year the heating plant has been thoroughly overhauled, resulting in the saving of considerable coal. Only one boiler is being used, instead of two, as formerly, and 84 radiators in the headhouse have been cut out. The electrical substation is in excellent condition, and considerable reduction in bills for electricity is anticipated. Many lights in the headhouse building and sheds, also on the viaduct and ramp, have been cut out. Water bills have been considerably lessened.

It has been necessary to put grain lighter "D. P. No. 2" into dock for cleaning, caulking and painting. The grain lighter "Ellen M. Golder" requires some attention, but it will not be necessary to place her in dock until she goes into active service again.

The electric winches have been overhauled. Several have been used the past year, resulting in an income of $871.71.

A comparative tabular statement as to income, etc., follows: —

Income from Operation of Commonwealth Pier No. 5.

	12 Ships, May 31, 1913, to Nov. 30, 1913.	48 Ships, 1913-14.	65 Ships, 1914-15.	109 Ships, 1915-16.
Railroad in,	$2,310 60	$5,122 68	$4,686 50	$8,866 39
Railroad out,	2,483 00	4,090 34	630 69	656 03
Wharfage in,	2,471 13	9,870 11	10,046 34	16,104 01
Wharfage out,	508 30	2,258 42	421 05	414 48
Passengers in, } Passengers out,	774 07	1,737 94	2,279 20	2,513 19
Ticket office,	774 91	469 32	314 99	436 17
Electric lights,	227 25	514 65	272 05	398 14
Electric winches,	–	–	502 13	817 71
Electric elevators,	–	–	712 63	1 50
Water,	338 19	1,573 57	1,786 94	1,310 43
Wharf storage,	1,262 41	907 33	6,506 06	3,724 85
Rent storage,	–	–	11 40	8,924 38
Sale of old salt,	–	–	325 66	422 04
Sale of old material,	–	–	–	24 00
Auction room,	–	–	50 00	65 00
Use of gangway,	–	–	45 00	–
Grain elevators,	408 30	–	–	–
Miscellaneous,	49 10	196 34	476 22	297 48
	$11,598 26	$26,740 70	$29,066 86	$44,975 80

Income for Dockage at Commonwealth Pier No. 5.

	1913-14	1914-15.	1915-16.
Dockage,	$10,110 00	$32,815 00	$8,193 75

Tonnage for Each Year.

	May 31, 1913, to Nov. 30, 1913 (Tons).	1913-14 (Tons).	1914-15 (Tons).	1915-16 (Tons).
Railroad in,	23,106	51,227	46,864	88,664
Railroad out,	24,830	40,903	7,107	6,560
Wharfage in,	8,237	33,060	31,420	53,680
Wharfage out,	1,695	7,540	3,588	1,382
Overside,	–	–	–	13,000
	57,868	132,730	88,979	163,286

Passengers Each Year.

	1913.	1914.	1915.	1916.
Passengers,	12,385	27,806	19,734	16,239

APPROPRIATIONS, CONTRIBUTIONS AND EXPENDITURES FOR RIVER AND HARBOR WORK UNDER THE DIRECTION OF THE BOARD OF HARBOR AND LAND COMMISSIONERS AND THE COMMISSION ON WATERWAYS AND PUBLIC LANDS, FROM 1893 TO 1916, INCLUSIVE (EXCEPTING BOSTON MAIN HARBOR).

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.
Acushnet River,	Inspection,	$2 15	–	$2 15
Allens Harbor, Harwich,	Surveys,	302 00	–	302 00
Annisquam River, Gloucester,	Dredging, removing ledges and rip-rap.	107,622 92	–	107,253 04
Apponagansett Harbor and River, Dartmouth.	Survey, dredging and stone breakwater.	55,465 72	–	55,092 18
Barnstable Harbor,	Survey and dredging,	13,747 18	$1,500 00	7,633 74
Bass River, Beverly,	Dredging,	25,539 81	55,535 75	81,075 56
Bass River, Dennis and Yarmouth.	Jetties, dredging and survey.	69,158 95	2,500 00	70,173 95
Brant Rock, Marshfield,	Sea wall,	965 84	–	965 84
Bucks Creek, Chatham,	Jetties, survey and dredging.	13,513 35	1,000 00	14,342 03
Bussards Bay, Falmouth,	Survey,	162 86	–	162 86
Catsumet Harbor and Squeteague Pond, Bourne and Falmouth.	Dredging,	26,378 39	7,350 00	33,584 48
Centerville River, Barnstable,	Dredging,	6,103 22	1,500 00	7,603 22
Cohasset Harbor, Cohasset and Scituate.	Breakwater and dredging.	33,634 22	20,691 88	54,326 10
Concord River, Billerica,	Removing bowlders,	1,514 59	150 00	1,664 59
Connecticut River,	Investigation of navigation and surveys.	10,637 04	–	6,970 99
Agawam,	Protective work,	20,396 09	–	18,814 42
Chicopee,	Survey, wall and rip-rap.	17,269 95	640 00	17,909 95
Hadley,	Protective work,	89,068 08	500 00	86,365 37[1]
Hatfield,	Dikes and rip-rap,	14,751 82	1,000 00	14,962 57
Holyoke,	Dredging and protective work.	18,815 78	415 00	4,230 78
Northampton,	Protective work,	1,525 80	–	1,524 20
South Hadley,	Wall,	4,072 74	1,000 00	5,045 96
West Springfield,	Protective work,	5,135 00	–	5,051 49[2]
Conservation of waters,	Investigation,	25,000 00	–	13,355 14
Cotuit Harbor, Barnstable,	Dredging and survey,	31,828 53	2,000 00	30,800 42
Cuttyhunk Harbor, Gosnold,	Jetties and dredging,	61,828 25	9,000 00	70,754 18
Deacons Pond Harbor, Falmouth.	Dredging and jetties,	46,001 03	14,000 00	60,001 03
Dorchester, easterly shore, Boston.	Dredging,	70,363 66	–	70,171 31
Duxbury Bay and Harbor,	Dredging,	26,551 59	–	26,551 59
East Bay, Osterville,	Jetties, dredging and removing scows.	23,864 35	–	23,529 79
Edgartown Harbor,	Survey,	205 65	–	205 65

[1] From 1888, inclusive.

[2] From 1891, inclusive.

APPROPRIATIONS, ETC. — *Continued.*

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.
Essex County beaches,	Survey,	$1,000 00	–	$1,000 00
Essex River, Essex,	Dredging,	5,000 00	–	5,000 00[1]
Fall River Harbor,	Improvement,	350,014 46	–	854 10
Falmouth Heights, Falmouth,	Sea wall,	4,625 22	$1,000 00	5,625 22
Gloucester Harbor, Gloucester,	Dredging and removing ledges.	23,305 77	–	23,305 77
Green Harbor, Marshfield,	Jetties, dredging and survey.	90,804 54	–	76,466 85
Gun Rock, Hull,	Breakwater,	14,345 53	–	14,345 53
Harbor Cove, Gloucester,	Survey and dredging,	15,670 07	–	15,670 07
Harbor View, Boston,	Dredging,	10,146 00	–	146 00
Herring River, Harwich,	Jetties and dredging,	33,329 72	2,000 00	35,110 42
Herring River, Wellfleet,	Dikes and ditches,	11,832 74	10,000 00	21,800 73
Hingham Harbor,	Dredging,	13,180 69	3,000 00	16,180 69
Houghs Neck, Quincy,	Dredging,	4,499 83	500 00	4,999 83[2]
Housatonic River, Sheffield,	Survey,	2,011 29	–	2,011 29
Hull,	Sea wall and survey,	25,238 32	9,000 00	34,120 38
Humarock Beach, Scituate,	Survey,	250 00	–	236 07
Hyannisport, Barnstable,	Survey and breakwater.	48,836 50	2,500 00	51,336 50
Improvement of rivers and harbors.	General expenses,	3,466 42	–	3,466 42
Ipswich River, Ipswich,	Jetty, wall rip-rap and dredging.	43,797 38	1,000 00	44,790 82
Island End River, Everett,	Survey,	264 10	–	264 10
Jeffries Point,	Dredging,	10,000 00	–	–
Lake Anthony, Oak Bluffs,	Jetties and dredging,	47,623 47	2,000 00	46,414 43
Lake Quannapowitt, Wakefield,	Investigation,	1,004 21	–	345 32
Lewis Bay, Barnstable,	Survey and dredging,	29,207 64	–	28,959 21
Little River, Gloucester,	Survey,	862 93	–	862 93
Lobster Cove, Gloucester,	Dredging,	17,603 98	1,500 00	19,103 98
Lynn Harbor, anchorage basin,	Survey and dredging,	62,901 67	5,200 00	62,700 45
Lynn Harbor and Saugus River,	Dredging and filling,	59,953 11	35,000 00	94,953 11
Manchester Harbor,	Jetties and dredging,	46,228 56	35,500 00	81,706 40
Menamsha Inlet, Chilmark and Gay Head.	Jetties, dredging and sea wall.	63,412 84	700 00	64,009 19
Merrimack River,	Investigation and survey.	669 26	–	569 26
Mill River, Gloucester,	Survey and dredging,	24,632 86	300 00	24,899 59
Mitchells River, Chatham,	Survey,	322 96	–	322 96
Nantucket Harbor,	Dredging,	42,058 63	1,000 00	42,779 78

[1] Expended by United States government. [2] For expenditures since 1911, see page 131.

APPROPRIATIONS, ETC. — *Continued.*

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.
Neponset River, Boston and Quincy.	Dredging, . . .	$34,270 44	-	$34,269 70[1]
New Bedford Harbor, . .	Pier, shed and dredging.	350,016 56	-	282,892 34
Nobscusset Harbor, Dennis, .	Breakwater, dredging and rip-rap.	23,868 86	$1,200 00	15,584 81
North River, Marshfield, .	Surveys and removing rocks.	6,858 75	1,800 00	8,658 75
North River, Salem, . .	Survey, ...	682 30	-	682 30
Oak Bluffs, ...	Removing rocks, .	500 00	-	462 50
Onset Bay, Wareham, . .	Survey and dredging,	14,067 89	1,000 00	15,067 89
Orient Heights, Boston, . .	Dredging, ...	3,500 00	-	3,144 52[1]
Pamet River, Truro, . .	Survey, ...	1,214 98	200 00	1,414 98
Paskamansett River, Dartmouth.	Dredging and jetty, .	5,227 68	-	5,227 68
Penikese Island, Gosnold, .	Pile wharf and survey,	5,200 00	-	5,192 95
Plum Island River, Newbury and Newburyport.	Survey, ...	983 31	-	983 31
Plymouth Harbor, . . .	Dredging, ...	165,268 59	71,794 55	210,560 87[2]
Poponesset Bay, . . .	Dredging, ...	5,384 64	-	5,384 64
Province Lands, Provincetown,	Reclamation, . .	83,000 00	-	68,136 66
Provincetown Harbor, . .	Survey, ...	207 41	-	207 41
Quansett Harbor, Orleans, .	Survey, ...	195 88	-	194 50
Quick's Hole, Gosnold, . .	Survey, ...	500 00	-	-
Revere, ...	Stone breakwater, .	60,407 09	-	60,397 98
Rock Harbor, Orleans, . .	Dredging, ...	12,106 25	400 00	12,492 71
Rockport Harbor, . . .	Dredging and removing rocks.	13,546 81	-	12,866 51
Salem Harbor, ...	Survey, ...	3,050 05	-	1,050 05
Salt Pond River, Eastham, .	Survey, ...	208 23	-	208 23
Salters Point, Dartmouth, .	Breakwater, . .	13,509 59	1,500 00	15,009 59
Sandwich Harbor, . . .	Dredging, rip-rap and jetties.	57,355 82	-	57,355 82
Saugus River, Lynn and Saugus.	Survey and dredging,	19,206 64	2,000 00	20,845 17
Scituate, ...	Sea walls and rip-rap,	50,446 30	235 00	49,576 43
Scituate Harbor, . . .	Dredging, ...	56,843 92	8,300 00	65,143 92
Scorton Harbor, Sandwich, .	Jetty and dredging, .	19,426 39	500 00	17,774 34
Sesuit Harbor, Dennis, . .	Jetty, ...	24,484 05	1,000 00	20,471 30
Shirley Gut, Boston and Winthrop.	Dredging, . . .	1,906 20	-	1,906 20
Sippican Harbor, Marion, .	Survey, ...	7 17	-	7 17
Sippowissett, Falmouth, . .	Survey, ...	3 25	-	3 25
Smith's Cove, Gloucester, .	Survey and dredging,	5,163 07	-	5,163 02

[1] For expenditure since 1911, see page 131.

[2] $57,000 expended under direction of United States government.

APPROPRIATIONS, ETC. — *Concluded.*

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.
South Boston, southerly shore,	Dredging,	$126,972 48	–	$126,972 44
South River, Salem,	Dredging,	10,523 65	$3,000 00	13,462 66
South Watuppa Pond, Fall River.	Fenders and excavation.	203 42	–	203 42
Stage Harbor, Chatham,	Dikes and survey,	10,803 01	–	10,803 01
Stony Beach, Hull,	Sea wall,	11,607 90	–	11,335 07
Taunton River,	Survey and investigation.	5,532 99	–	1,960 51
Taunton-Brockton Waterway,	Investigation,	5,388 46	–	5,278 18
Taunton River-Boston Harbor Canal.	Survey,	10,000 00	–	9,932 75
Taunton River-Massachusetts Bay.	Survey,	552 87	–	552 87
Vineyard Haven,	Sea walls,	8,012 62	1,380 50	9,393 12
Vineyard Haven Harbor, Tisbury.	Breakwater and dredging.	45,069 48	1,000 00	45,518 25
Waquoit Bay, Falmouth,	Survey, breakwater and bulkhead.	1,716 91	–	1,418 52
Wareham River,	Survey and dredging,	13,993 08	5,000 00	18,993 08
Warrens Cove, Plymouth,	Sea wall,	1,515 36	9,177 48	9,760 84
Watch Hill, Chatham,	Survey and rip-rap,	15,020 47	–	14,968 75
Wellfleet Harbor,	Survey and dredging,	15,363 48	1,500 00	17,363 48
West Bay, Barnstable,	Jetties and dredging,	45,460 82	–	45,423 45
West Falmouth Harbor, Falmouth.	Dredging,	25,655 31	–	24,386 18
Westfield River,	Survey,	5,000 00	–	120 43
Weymouth Fore River, Quincy, Braintree, Weymouth.	Dredging,	38,991 19	–	24,866 70[1]
Wild Harbor, Falmouth,	Jetty and dredging,	15,671 59	5,000 00	15,614 72
Winthrop Harbor Channel,	Dredging,	18,959 21	700 00	17,704 63[1]
Winthrop Harbor, Cottage Park,	Dredging,	6,603 00	–	6,581 66[1]
Winthrop Shore,	Sea wall,	15,481 62	3,000 00	18,481 62
Witchmere Harbor, Harwich,	Jetties and dredging,	28,662 06	1,000 00	29,519 26
Wollaston Beach, Quincy,	Dredging,	15,066 00	–	14,644 61[1]
Woods Hole, Great Harbor, Falmouth.	Dredging,	5,468 86	1,500 00	6,968 86
Wrecks,	Removal from tidewater.	65,616 66	–	7,005 08
Yarmouthport Harbor,	Survey,	308 58	–	308 58
		$3,542,988 46	$351,170 16	$3,237,067 11

[1] For expenditures since 1911, see page 131.

CONTRIBUTIONS AND EXPENDITURES FOR RIVER AND HARBOR WORK UNDER DIRECTION OF THE HARBOR AND LAND COMMISSIONERS FROM DEC. 1, 1915, TO AUG. 3, 1916, AND UNDER DIRECTION OF THE COMMISSION ON WATERWAYS AND PUBLIC LANDS FROM AUG. 3, 1916, TO NOV. 30, 1916, MADE UNDER (CHAPTER 481, ACTS OF 1909, CHAPTER 642, ACTS OF 1912, AND CHAPTER 318, SPECIAL ACTS OF 1916).

LOCATION.	Character of Work.	Contribution by Municipality or Others.	Expenditure.
Allens Harbor, Harwich,	Survey,	–	$83 50
Annisquam River,	Advertising,	–	7 50
Apponagansett River,	Dredging,	–	4,943 42
Barnstable Harbor,	Survey,	–	10 42
Bass River, Dennis and Yarmouth,	Dredging,	–	6,676 27
Brant Rock, Marshfield,	Sea wall,	–	962 24
Bucks Creek, Chatham,	Survey,	–	52 45
Cataumet Harbor and Squeteague Pond, Bourne and Falmouth.	Inspection,	–	13 60
Chicopee, Connecticut River,	Wall and rip-rap,	–	2,024 99
Cohasset Harbor, Cohasset and Scituate.	Survey,	–	62 93
Concord River, Billerica,	Removing bowlders,	–	1,495 88
Cotuit Harbor,	Survey,	–	356 68
Cuttyhunk Harbor, Gosnold,	Dredging,	$1,000 00	9,281 57
Dennis Harbor,	Maps,	–	3 48
Duxbury Bay, Duxbury,	Dredging,	–	7,297 39
East Bay, Osterville,	Survey,	–	192 25
Gloucester Harbor,	Dredging and removing ledges.	–	11,288 81
Green Harbor,	Survey,	–	133 59
Gun Rock, Hull,	Breakwater,	–	14,345 53
Hadley, Connecticut River,	Survey,	–	103 04
Hatfield, Connecticut River,	Rip-rap,	–	2,706 40
Herring River, Harwich,	Survey,	–	102 75
Holyoke, Connecticut River,	Dike and rip-rap,	–	557 07
Hyannisport,	Breakwater,	–	27,010 25
Ipswich River, Ipswich,	Dredging,	–	26,081 96
Lake Anthony,	Survey,	–	23 57
Lewis Bay, Barnstable,	Dredging,	–	2,946 99
Lynn Harbor, anchorage basin,	Dredging,	–	747 24
Lynn Harbor and Saugus River,	Dredging,	–	9,877 37
Menamsha Inlet, Chilmark,	Sea wall and dredging,	–	465 10
Merrimack River,	Inspection,	–	7 21

CONTRIBUTIONS, ETC. — *Concluded.*

LOCATION.	Character of Work.	Contribution by Municipality or Others.	Expenditure.
Mill River, Gloucester,	Survey,	–	$11 92
Miscellaneous expenses,	– – –	–	386 57
Mitchell's River, Chatham,	Survey,	–	322 96
New Bedford Harbor,	Inspection,	–	10 80
Nobscusset Harbor, Dennis,	Rip-rap and breakwater,	–	11,112 57
North River, Salem,	Survey,	–	682 30
Plymouth Harbor,	Dredging,	–	2,917 34
Poponesset Bay,	Dredging,	–	5,384 64
Rockport Harbor,	Advertising,	–	1 13
Salt Pond River, Eastham,	Survey,	–	206 98
Salters Point, Dartmouth,	Survey,	–	48 87
Sandwich Harbor,	Jetty, rip-rap,	–	6,254 88
Scituate,	Sea walls,	–	6,892 41
Scituate Harbor,	Maps,	–	6 97
Smiths Cove, Gloucester,	Maps,	–	72
South River, Salem,	Maps,	–	90
Stage Harbor, Chatham,	Survey,	–	62 80
Taunton-Brockton waterway,	Investigation,	–	179 38
Taunton River, Massachusetts Bay,	Survey,	–	552 87
Vineyard Haven, Tisbury,	Sea walls,	$750 00	2,450 93
Waquoit Bay,	Breakwater and bulkhead,	–	346 13
Wareham River,	Dredging,	5,000 00	18,051 64
Warrens Cove, Plymouth,	Sea wall,	5,932 71	7,722 25
Wellfleet Harbor,	Inspection,	–	9 25
Wild Harbor, Falmouth,	Jetty,	–	600 86
Winthrop Shore protection,	Sea wall,	–	471 97
Yarmouthport Harbor,	Survey,	–	308 58
		$12,682 71	$194,859 07

FEDERAL APPROPRIATIONS AND EXPENDITURES.

Federal appropriations and expenditures for improvement of rivers and harbors in Massachusetts from the establishment of the government to the close of the fiscal year ending June 30, 1916, are shown in the following tables furnished by the Chief of Engineers, U. S. A.: —

TABLE No. 1. — *Localities at Present under Improvement.*

[Compiled from the annual report of the Chief of Engineers for the fiscal year ending June 30, 1916.]

LOCALITY.	Expenditures.	Appropriations.
Newburyport Harbor,	$474,868 27	$493,500 00
Merrimack River,	404,301 48	415,366 72
Sandy Bay, Cape Ann, harbor of refuge,	1,940,990 22	1,950,000 00
Gloucester Harbor,	521,678 24	542,083 00
Beverly Harbor,	48,997 24	48,997 24
Salem Harbor,	71,368 66	72,500 00
Lynn Harbor,	421,367 74	476,837 00
Mystic River (upper portion),	29,044 88	29,044 88
Mystic River (below mouth of Island End River),	273,764 52	283,005 12
Malden River,	69,750 00	149,950 00
Boston Harbor,[1]	12,269,996 19	12,570,827 58
Dorchester Bay and Neponset River,	94,933 00	95,233 00
Weymouth Fore River,	175,432 06	390,750 00
Weymouth Back River,	26,000 00	27,000 00
Plymouth Harbor,	368,392 68	391,959 80
Provincetown Harbor,	348,062 72	362,162 97
Pollock Rip Shoals, Nantucket Sound,	250,358 26	400,000 00
Hyannis Harbor,	221,787 75	221,767 07
Nantucket harbor of refuge,	569,037 74	586,473 50
Woods Hole Channel,	343,599 92	344,000 00
New Bedford and Fairhaven harbors,	702,904 33	754,310 00
Taunton River,	200,947 08	210,189 18
Fall River Harbor,	379,276 68	380,911 49
Totals,	$20,206,859 66	$21,196,868 55

[1] Including Chelsea Creek.

TABLE No. 2. — *Localities in which Work is not now in Progress.*[1]

[Compiled from data furnished by the United States Treasury Department.]

RECAPITULATION.	Expenditures.	Appropriations.
Total of Table No. 1,	$20,206,859 66	$21,196,868 55
Total of Table No. 2,	676,244 71	677,899 20
Grand totals,	$20,883,104 37	$21,874,767 75

[1] No change from last year's figures.

TABLE No. 3. — *Expenditures on Boston Harbor and its Tributaries to June 30, 1916.*

[The tributaries given are those now under improvement, and do not include tributaries heretofore improved, which may be taken from preceding table.]

LOCALITY.	Expenditures.	Appropriations.
Boston Harbor proper,[1]	$12,269,996 19	$12,570,827 58
Mystic River (below mouth of Island End River),	273,764 52	283,005 12
Mystic River (upper portion),	29,004 88	29,004 88
Malden River,	69,750 00	149,950 00
Totals,	$12,642,515 59	$13,032,787 58

[1] Including Chelsea Creek.

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